# Iles Mountain Tract

## Site Specific Analysis

Craig District Office
Bureau of Land Management
Craig, Colorado

November, 1982

Iles Mountain

Table of Contents

# Iles Mountain Site Specific Analysis

## 1. Introduction

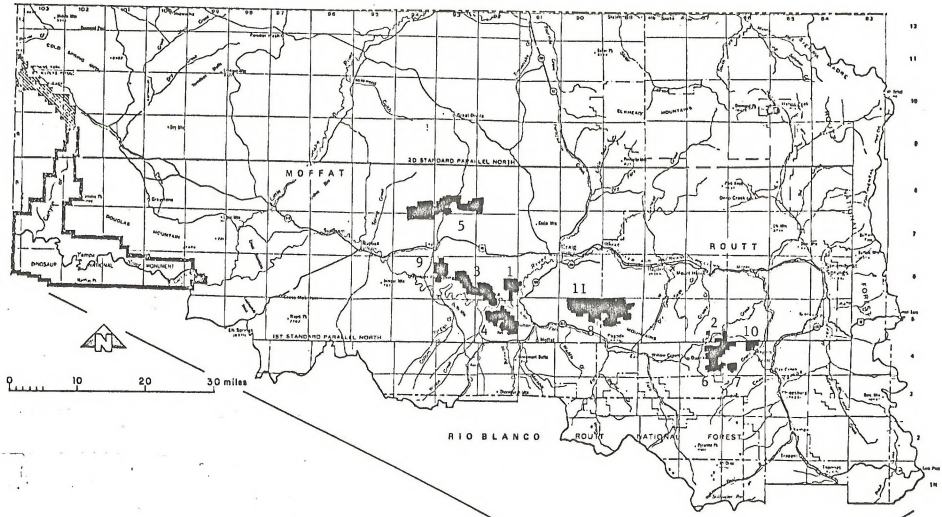
This tract is located in Moffat County, Colorado. The tract lies twelve miles southwest of Craig, Colorado (Map 1) in T. 5 N., R. 92 W.

The site specific analysis is an assessment of the impacts to the environment based on assumptions of how the coal, in a specific tract, would be developed. The assumptions used for analysis for this tract are found in the Iles Mountain Tract Profile Report (Bureau, 1982). See Map 2 for disturbed areas on tract.

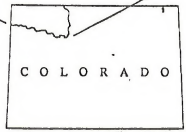
### 1.1 Alternatives

This site specific analysis assesses the impacts of the Development Alternative since the No Action Alternative would not impact the natural environment. The Development Alternative assumes that the tract would be leased and developed as a surface mine. A full discussion of the development and No Action Alternative can be found in the Iles Mountain Tract Profile Report (Bureau, 1982).

MAP 1




1. BELL ROCK
2. FISH CREEK
3. HORSE GULCH
4. ILES MTN.
5. LAY CREEK
6. L. MIDDLE CR.
7. MIDDLE CREEK
8. PECK GULCH
9. SIGNAL BUTTE
10. TROUT CREEK
11. WILLIAMS FORK




OFF TRACT RR SPUR
5 ac
LEADOUT
T 5 N
Draw
Trail
Ralston
Creek
10
11
12
Post
Oak
5 ac DISTURBANCE FOR HAUL ROADS
PIT 1
460 ac
TOPSOIL
PILE
110 ac
SPOILS
5
14
SURFACE
FACILITIES
100 ac
Post Oak
Spring
MOUNTAIN
22
23
24
ILES
PIT 2
290 ac
TOPSOIL
PILE
130 ac
SPOILS
7
24
Ralston
Spring
Ralston
R 92 W
Draw
MOUNTAIN
26
25

## 2. Climate and Air Quality

Not Available.

# 3. Geology

## 3.1 Affected Environment

### 3.1.1 Topography

The tract is located on the northern slopes of the Axial Basin approximately 12 miles southwest of Craig, Colorado in Moffat County. The general topography of the tract is characterized by steep south facing escarpments and moderately gentle north facing dip slopes with elevations ranging from 6200 feet to 7520 feet. The tract is dissected by numerous ephemeral or intermittent streams which drain into the Williams Fork and Yampa Rivers respectively.

### 3.1.2 Stratigraphy

Sedimentary rocks outcropping on tract are limited to the late Cretaceous Mesaverde Group which consists of the Iles Formation at the base and the Williams Fork Formation at the top (Haun, 1960).

The Iles Formation (about 1350 feet thick) is composed of interbedded sandstones, shales and noncommercial coal seams. A prominent marker bed, the Trout Creek Sandstone, is found at the top of the Iles.

The Williams Fork Formation consists of about 1600 feet of alternating beds of sandstone, sandy shales, shales and coal seams of the Middle and Upper Coal

Groups. A prominent marker bed, the Twentymile Sandstone, is located in the upper Williams Fork (Figure 3-1) and outcrops in the tract. Six coal seams in the tract are potentially valuable; the A, D1, E, F, Hart, and H seams occur within the Middle Coal Group in a zone that extends from 43 feet to 960 feet above the Trout Creek Sandstone (Table 3-1: Bureau, 1979).

Structure

The tract is structurally located between the respective axes of the Axial Basin Anticline, located 4 1/2 miles southwest and the Round Bottom Syncline, the axis of which passes through the eastern portion of the tract. Dips on tract range between 8 and 10 degrees to the north conforming to the broad nature of the respective structure (Dames and Moore, 1979 a & b).

3.1.4 Minerals

3.1.4.1 Coal

Coal deposits of the Iles Mountain tract occur in six seams (A, D1, E, F, Hart and H); however, only the H seam (19 feet thick) is potentially mineable by surface methods (overburden/thickness ratio = 10/1). The total coal resources contained in the H seam is 38,198,000 tons with a mineable reserve of 33,469,000 tons. Detailed information on the coal resources of this tract can be found in the tract delineation report prepared by Minerals Management Service (1982).

Surface mining on the tract would be to a depth of about 200 feet and require excavation of the Twentymile Sandstone north of the E 1/4 corner of Section 15.

3.1.4.2 Oil and Gas

No drilling for oil and gas resources has taken place on tract; however, the Iles Dome oil field and the Moffat oil field are located approximately four miles and three miles south and southeast of the tract respectively. The tract itself is covered by numerous oil and gas leases. Production in the area is from the Niobrara Shale, Mancos Formation, Frontier Sandstone, Dakota Sandstone, Morrison Formation, Curtis Sandstone, Entrada Sandstone, Shinarump Formation and the Weber Sandstone. All of these formations are found at depth under the tract.

3.1.4.3 Locatable Minerals

Locatable minerals subject to the General Mining Laws of 1872 are not known to exist in the area and none are expected to be found on tract. A mining claim search revealed no claims on tract.

3.1.4.4 Saleable Minerals

Alluvium and colluvium deposits consisting of unconsolidated rock debris, sand, silt, and clay are found in the drainages of the tract. Scoria, formed by in-place burning of coal seams, is also found on the tract. These scoria

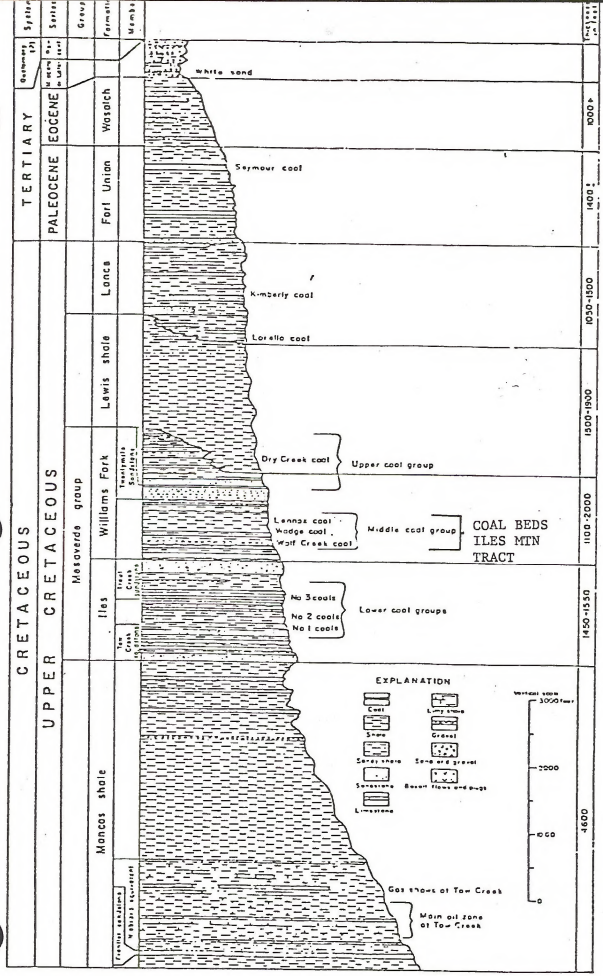



Figure 3-1. Generalized stratigraphic section, northwest Colorado (Bass, Eby, and Campbell, 1955).

Table 3-1

DETAILS OF COAL BEDS CONSIDERED ECONOMIC IN THE ILES MOUNTAIN STUDY AREA

| Bed | Maximum Thickness | Minimum Thickness | Weighted average Thickness | Maximum distance above top of next lower unit | Minimum distance above top of next lower unit | Comments** |
|---|---|---|---|---|---|---|
| A | 10' | 2' | 7' | 43' above TC* | 7' above TC* | |
| $D^1$ | 16' | 2' | 7' | 220' above A bed | 136' above A bed | Top bed in D D "zone" chosen. |
| E | 21' | 4' | 16' | 96' above $D^1$ bed | 14' above $D^1$ bed | |
| F | 17' | 6' | 16' | 95' above E bed | 45' above E bed | Top bed in F "zone" chose. |
| | 17' | 6' | 7.5' | 221' above F bed | 122' above F bed | Contains multiple partings. All or top 2 beds chose. |
| H | 25' | 8' | 19' | 113' above Hart bed | 89' above Hart bed | Top bed in H "zone" chosen. |

*Trout Creek Sandstone

**In some cases a single coal bed will split into several coal seams and become a coal zone. Because the seams within these groups are generally too close together to be mined separately, the mining Supervisor's Office has chosen the most economically minable bed or beds in each zone for consideration in this report.

beds can be quarried without blasting and used for road construction and maintenance.

3.1.5 Paleontology

The Williams Fork Formation has been characterized as having an almost total lack of fossils, except for trace fossils (Collins, 1976). Fossils found, however, include fossil plants, leaf impressions in coal, ammonites, pelecypods and gastropods (Figure 3-2, Bureau, 1976).

All of the fossils of the Mesaverde Group have been characterized as common types having a wide stratigraphic range and a broad areal distribution, rendering them of limited scientific value.

3.2 Environmental Consequences

Geology, Topography, Minerals

The major geologic impact of the Iles Mountain tract would be the amount of coal mined and the amount left behind as unrecoverable because of present mining technique. As much as 33.5 million tons of H seam coal could be mined, leaving approximately 4.5 million tons of coal unrecoverable with present mining technology.

Surface mining in the area north of the E 1/4 corner of Section 15 would require the excavation of the Twentymile Sandstone to extract H seam coal. The

natural topography and rock strata would be altered by mining.

Surface mining on the tract would involve the removal of up to 200 feet of surficial materials and subsurface strata. The surface mining of the H coal seam would have no impact on possible future mining of the coal resources contained in the A, D1, E, F and Hart coal seams. These seams, if mined at a later date, would be mined by subsurface methods. Backfilling and reclamation would be unable to restore the topography to its original condition, but would result with a natural appearing topography.

Because of the alternating sandstone and shale layers in the Williams Fork Formation, the dip slope conditions of the tract are susceptible to landslides. The effect of these landslides should be minimal to nonexistent during and after mining.

There are no known major faults located on tract. Minor faults associated with the Axial Basin anticline and the Round Bottom syncline may be encountered during mining, but the potential for geologic hazards associated with them is very low.

No potential or major impacts to locatable or saleable minerals is expected on the tract. According to Public Law 585, Multi-Mineral Development Act, any conflict arising between coal and other minerals must be resolved by the respective lessees or claimants.

| ERAS | PERIODS AND SYSTEMS | EPOCHS AND SERIES | FORMATION | ENVIRONMENT | COMMON FOSSILS PRESENT | REFERENCES |
|---|---|---|---|---|---|---|
| CENOZOIC | TERTIARY | Miocene | Browns Park Formation | Fluvial Lacustrine; Eolian, Tuffs Airborne From Distant Volcanoe | Ostracodes and Diatoms Vertebrate Fossils; Camel, Horse | Eapstd, 1965 Peterson, 1920 McGrew, 1951 |
| | | | Bishop Conglonbrate | Fluvial | Non Fossiliferous | |
| | | Eocene | Bridger Formation | Fluvial | Vertebrate Fossils | Gazin, 1959 |
| | | | Green River Formation | Fluvial Lacustrine | Vertebrate Fossils; Fossil Fish; Fossil Leaves and Insects. Fresh Water Gastropods and Pelecypods | Robinson, 1974 Bradley, 1964 |
| | | Paleocene and Eocene | Wasatch Formation | Fluvial and Lacustrine | Vertebrate Fossils, Mammals Some Ostracodes and Gastropods. Fossil leaves, Genus Aralia | Miser, 1929 McKenna, 1955 |
| | | Paleocene | Fort Union Formation | Fluvial in Part of Swamps and Marshes | Vertebrate Fossils Fossil Leaves | Robinson, 1974 Hansen, 1965 |
| | | | Ohio Creek Formation | Fluvial | Non Fossiliferous | |
| MESOZOIC | CRETACEOUS | Upper Cretaceous | Lance Formation | Fluvial Import Swamps | Non Fossiliferous; A few leaf fossils; Vertebrate fossils | Dorf, 1910 Robinson, 1974 |
| | | | Lewis Shale | Marine off-shore | All Marine Fossils-- Ammonites, Pelecypods, Crinoids, Gastropods | Hancock, 1925 Miser, 1929 Dorf, 1938, 1942 |
| | | | MESAVERDE GROUP: Williams Fork Formation | Fluvial in Part Swamps Litteral some Marine Shales | Fossil plants from Genera Picus, Myrica, Eriocaulos, & Salix. Fossil Leaves in Coal. Ammonities & Inoceramus Clams in Marine Shales. Pelecypods, Gastropods | Hancock, 1925 Miser, 1929 Bass, Eby, Campbell, 1955 |
| | | | MESAVERDE GROUP: Iles Formation | Fluvial in Part Swamps Litteral some Marine Shales | Pelecypods, Fossil Leaves in Steamboat Springs & in the Coal Ammonities and Inoceramus Clams in Marine Shales--Fossil Plants of Genera Picus & Halymenites | Hancock, 1925 Miser, 1929 Bass, Eby, Campbell, 1955 |
| | | | Mancos Shale | Marine Offshore | Ammonites--Baculites' Scaphites, Inoceramus Clams Pelecypods, Cephalopods | Hancock, 1925 Miser, 1929 |
| | | | Frontier Sandstone | Marine Brackish Water | Pelecypods, Shark Teeth, and Plant Fossils | |
| | | Lower Cretaceous | Mowry Shale Member of Mancos | Marine Offshore | Carbonized Wood, Cyclord Fish Scales, Fish Bones | |
| | | | Oakota Sandstone | Fluvial, Marshes and Swamps | Silicified Wood, Ferns Oinosaur, Mollusk | Waage, 1959 |

Fig. 3-2. Fossiliferous Formations in the Study Region

Paleontology

Disturbance of paleontological resources would result in both adverse and beneficial impacts. Some fossils would inevitably be destroyed by mining but others could be discovered. Because of the insignificance of the fossils expected to be disturbed or encountered, neither the adverse nor the beneficial effects are expected to be of importance.

3.2.1 Irreversible/Irretrievable Commitment of Resources

The removal of approximately 33.5 million tons of coal would be considered an irretrievable commitment of resources, and approximately 4.5 million tons of unrecoverable coal because of present mining technique.

3.2.2 Short Term Use vs. Long Term Productivity

Short term use of the tract for the mining of coal would mean the permanent loss of 33.5 million tons of mined coal and approximately 4.5 million tons of unrecoverable coal because of present mining technique. If coal is not mined at present, improvements in mining technology could increase long term coal production.

3.2.3 Committed Mitigation Paleontological Resources

1) Before undertaking any surface disturbing activities on the leased lands, the lessee shall contact the appropriate District Office of the Bureau of Land

Management to determine if the leased lands fall within a Class I-a or Class I-b paleontological classification area.

2) If the leased lands fall within a Class I-a or Class I-b area or in areas not classified yet, a paleontological survey shall be required to establish the presence or absence of scientifically significant fossils as defined in IM CO-80-398 Change 2. No paleontological surveys will be required in Class II or Class III areas.

3) The paleontological survey shall be conducted by the appropriate BLM district and/or area geologist, if available. Otherwise, it shall be conducted by a qualified paleontologist approved by the BLM district geologist.

4) If scientifically significant fossils are encountered during the survey, the lessee's mining plan shall address appropriate steps for salvaging and/or avoiding the fossils.

5) Should any vertebrate fossils be uncovered during any surface disturbing activities or during any mining operations, the BLM district geologist shall be contacted immediately, as well as the Administrator of the Western Technical Center (OSM), or the District Mining Supervisor, as appropriate. Operations may continue as long as the fossils are not destroyed or lost by the activity. An evaluation of the fossils shall be completed by the BLM district geologist or a BLM-approved paleontologist within five working days, and the lessee will be notified of what actions will be taken.

6) All scientifically significant fossils shall remain under the jurisdiction of the United States until ownership is determined under applicable law. Copies of all paleontological resource data generated as a result of the lease term requirements shall be provided to the BLM district geologist, and to the Administrator of the Western Technical Center (OSM), or the District Mining Supervisor, as appropriate.

7) The cost of any required salvage of such fossils shall be borne by the United States.

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: Surface Mine

| Resource Element | Committed Mitigation | Anticipated Impact Baseline | 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Geologic hazards | | Potential for small mass movements | ——> | ——> | ——> | ——> | Good | None | Slopes <10°; competent formations; dip-slope conditions exist. |
| Seismic activity | | None | ——> | ——> | ——> | ——> | Good | None | No major faults; low seismic zone. |
| Potential for other minerals | Multi-Mineral Development Act | Low | ——> | ——> | ——> | ——> | Good | | No present conflict, potentially valuable for oil and gas |
| Paleontology | See narrative | Low | ——> | ——> | ——> | ——> | Good | Loss of fossil remains | Beneficial effect of exposure |

REFERENCES CITED


Bureau of Land Management, 1976. Final Environmental Statement, Northwest Colorado Coal, U.S. Department of the Interior.

Bureau of Land Management, 1979. Site Specific Analysis, Iles Mountain Tract - Green River/Hams Fork Environmental Statement, Round I. U.S. Department of the Interior.

Bureau of Land Management 1975, Taylor Creek Study Site, Axial Basin Coal Field EMRIA Report No. 3 - 1975, U.S. Department of Interior.

Collins, B.A., 1976. Coal Deposits of the Carbondale, Grand Hogback and Southern Danforth Hills Coal Fields, Eastern Piceance Basin, Colorado. Quarterly of Colorado School of Mines, Vol. 1, No. 1.

Empire Energy Corp., 1979. Mine plan for Eagle Mine Complex, Moffat County, Colorado.

Haun, J. D. and Weimer, R. J., 1960. Cretaceous Stratigraphy of Colorado. Colorado School of Mines. Golden, Colorado.

U.S. Department of Agriculture, Soil Conservation Service, Soil Survey Manuscript for Moffat County (Unpublished).

U.S. Department of Agriculture, Soil Conservation Service, Soil Form 5's, Colorado.

Dames and Moore, 1979 a. Coal Resource Occurrence and Coal Development Potential Maps of the Monument Butte Quadrangle, Moffat County, Colorado. USGS open file report 79-281.

Dames and Moore, 1979 b. Open file report 79-814. Coal Resource Occurrence and Coal Development Potential Maps of the Round Bottom Quadrangle, Moffat County, Colorado. USGS open file report 79-814.

Thornburg, A. A., 1982, Plant Materials for Use on Surface-Mined Lands in Arid and Semiarid Regions: U.S. Department of Agriculture, Soil Conservation Service, Technical Paper 157, Washington, D.C. 88 pgs.

Bass, N. W., Eby, J. B., and Campbell, M. R., 1955. Geology and Mineral Fuels of Parts of Routt and Moffat Counties, Colorado. USGS Bull. 1027-d.

## 4. Soils

### 4.1 Affected Environment

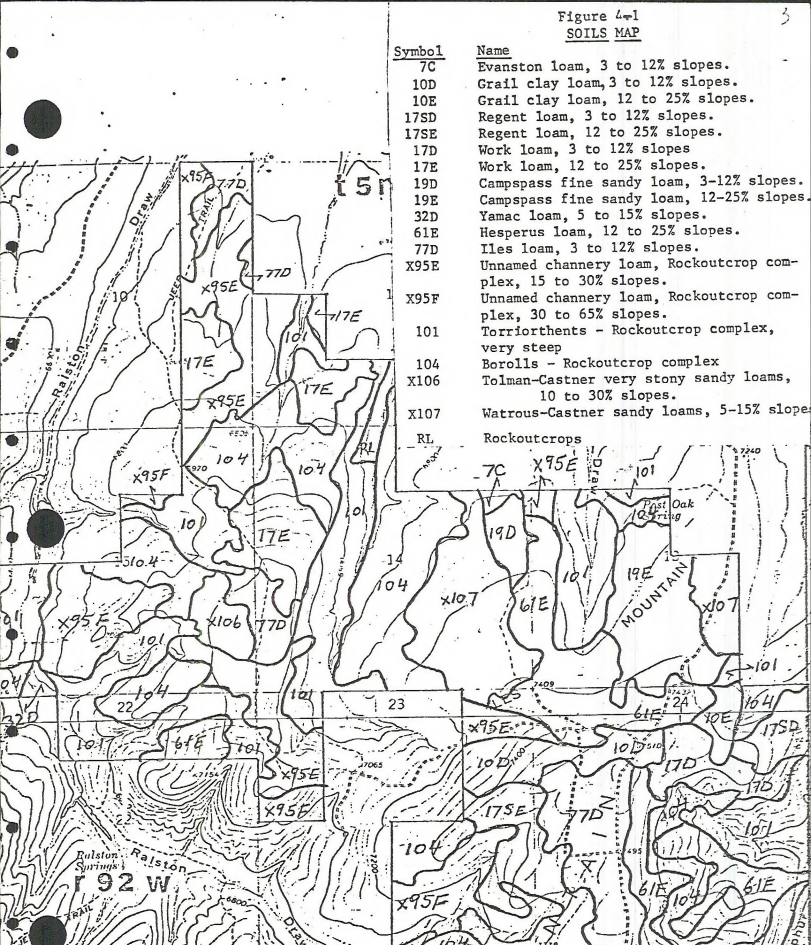
The soils within the tract are formed primarily in residuum from fine grained sandstone and shale. Soils on tract are also formed in mixed aeolian and alluvium from sandstone and shales. Bottomland soils occur on stream terrace, floodplains, alluvial fans, and in swale positions. Upland soils occur on dissected plateaus, steep to very steep hillsides, nearly barren mountain sideslopes and ridgetops. There are also escarpment faces and vertical sandstone ledges found in the lease area.

The U.S. Department of Agriculture, Soil Conservation Service completed an Order 2 soil survey of the tract area in 1979. Nineteen mapping units have been identified within the tract and are described in the Moffat County Soil Survey Report. Of the 19 mapping units, 12 are classified at the series level, 6 are classified as complexes and 1 mapping unit is a miscellaneous landform. Refer to the Soils Map (Figure 4-1). The physical characteristics of the soils on tract are described in Table 4-1 and the soil limitations are listed in Table 4-2 were derived from the soil survey report.

#### 4.1.1 Prime and Unique Farmlands

There are no known prime or unique farmlands occurring on the tract. However, prime and unique farmland identification has not yet been completed in Moffat County.

Figure 4-1
SOILS MAP



| Symbol | Name |
|---|---|
| 7C | Evanston loam, 3 to 12% slopes. |
| 10D | Grail clay loam, 3 to 12% slopes. |
| 10E | Grail clay loam, 12 to 25% slopes. |
| 17SD | Regent loam, 3 to 12% slopes. |
| 17SE | Regent loam, 12 to 25% slopes. |
| 17D | Work loam, 3 to 12% slopes |
| 17E | Work loam, 12 to 25% slopes. |
| 19D | Campspass fine sandy loam, 3-12% slopes. |
| 19E | Campspass fine sandy loam, 12-25% slopes. |
| 32D | Yamac loam, 5 to 15% slopes. |
| 61E | Hesperus loam, 12 to 25% slopes. |
| 77D | Iles loam, 3 to 12% slopes. |
| X95E | Unnamed channery loam, Rockoutcrop complex, 15 to 30% slopes. |
| X95F | Unnamed channery loam, Rockoutcrop complex, 30 to 65% slopes. |
| 101 | Torriorthents - Rockoutcrop complex, very steep |
| 104 | Borolls - Rockoutcrop complex |
| X106 | Tolman-Castner very stony sandy loams, 10 to 30% slopes. |
| X107 | Watrous-Castner sandy loams, 5-15% slope |
| RL | Rockoutcrops |

Table 4-1 SOIL DESCRIPTORS

| MAPPING UNIT | | | | | | | SURFACE | | | SUBSURFACE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol | Name | Extent Composition % | Landscape Position | Slope % | Depth and Drainage Class | Texture | Depth (Inches) | pH | Texture | Depth (inches) | pH | Parent Material |
| 7C | Evanston loam | 6 acres/1% | Gently to strongly sloping terraces | 3-12 | Deep and well drained | Loam | 8 | 6.6-7.8 | Calcareous loam to clay loam | Extending to about 60" | 7.4-9.0 | Formed in loess from mixed sources |
| 10D | Crail clay loam | 67 acres/2% | Upland valleys and ridge tops | 3-12 | Deep and well drained | Clay loam | 6 | 6.6-7.3 | Clay to calcareous clay | Extending to about 40" | 7.9-8.4 | Weathered Manco shale |
| 10E | " | 21 acres/1% | | 12-25 | | " | " | | | | | |
| 17SD | Regent loam | 33 acres/1% | Occurs on upland benches and sideslopes | 3-12 | Moderately deep and well drained | Loam | 9 | 6.6-8.4 | Heavy clay loam to calcareous clay loam | Extends to about 35" | 6.6-8.4 | Formed in interbedded sandstone and shale |
| 17SE | " | 126 acres/4% | | 12-25 | | " | | | | | | |
| 17D | Work loam | 55 acres/2% | Gently to strongly sloping benches and sideslopes | 3-12 | Deep and well drained | Loam | 10 | 6.6-7.8 | Clay loam to heavy clay loam | Extends to about 60" | 7.4-9.0 | Formed in residuum from sandstone and shale |
| 17E | " | 144 acres/6% | | 12-25 | | " | | | | | | |
| 19D | Campsass fine sandy loam | 22 acres/1% | Occurs on upland valley slopes and benches | 3-12 | Deep and well drained | Fine sandy loam | 4 | 6.6-7.3 | Heavy clay loam to calcareous heavy clay loams | Extending to about 60" | 7.4-8.4 | Formed in residuum from sandstone and shale |
| 19E | " | 120 acres/4% | | 12-25 | " | " | | | | | | |

Table 4-1 SOIL DESCRIPTORS (cont.)

| MAPPING UNIT Symbol | Name | Extent Composition % | Landscape Position | Slope % | Depth and Drainage Class | Texture | SURFACE Depth (Inches) | pH | Texture | SUBSURFACE Depth (inches) | pH | Parent Material |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32D | Yamac loam | 7 acres/1% | Occurs on upland ridges | 5-15 | Deep and well drained | Loam | 5 | 6.6-8.4 | Loam | Extends to from 20 to 60" | 7.9-8.4 | Developed in weathered sandstone, siltstone and loess |
| 61E | Hesperus loam | 283 acres/10% | Strongly sloping to moderately steep mountain sideslopes | 12-25 | Deep and well drained | Loam to silt loam | 8 | 6.1-7.8 | Clay loam | Extending to about 60" | 6.1-7.8 | Developed in residuum from sandstone and shale |
| 77D | Iles loam | 237 acres/8% | Mountain ridgetops and sideslopes | 3-12 | Deep and well drained | Loam | 8 | 6.6-7.3 | Silty clay loam and calcareous loams | Extends to about 30" | 7.4-9.0 | Residuum from shale and sandstone |
| X95E | Unnamed channery loam-rockoutcrop complex | 254 acres/9% | Strongly sloping to steep ridges and mountain sideslopes | 15-30 | Moderately deep and well drained | Channery loam | 2 | 6.6-7.3 | Channery to flaggy clay loam | Extending to about 25 to 40" | 7.9-8.4 | Formed in colluvium and residuum from shale and sandstone |
| X95F | " | 203 acres/7% | | 30-65 | | " | " | | | | | |
| | | Unnamed portion 65% of the complex rockoutcrop makes up 20% of the complex | | | | | | | | | | |

Inclusions 15%

TABLE 4-1 SOIL DESCRIPTORS (cont.)

| MAPPING UNIT Symbol | Name | Extent Composition % | Landscape Position | Slope % | Depth and Drainage Class | Texture | SURFACE Depth (Inches) | pH | Texture | SUBSURFACE Depth (inches) | pH | Parent Material |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 101 | Torriorthents-rockoutcrop complex | 477 acres/17% | Strongly sloping to very steep | Very steep | Shallow to moderately | Coarse to medium textured stony | | | | | | |
| | Torriorthents | 50% of the mapping unit | complex occurring on terrace and | 15-90 | deep and well drained | and cobbly | 0-5 | Var-ied | — | Extends 10-40" | — | Alluvial and colluvial fans |
| | Rockoutcrop | 40% of the mapping unit | escarpment faces and valley | | | | " | " | " | less than 4" | " | Sedimentary rock ledges |
| | Inclusions | 10% of the mapping unit | sideslopes | | | | | | | | | |
| 104 | Borolls-rockoutcrop complex | 498 acres/18% | Moderately steep to very steep slopes | 15-90 | | | | | | | | |
| | Borolls | 50% of the mapping unit | on north and west valley sideslopes | | Shallow to deep and well drained | Loam to sandy loams — | 8-20 | Var-ied | Sandy clay loam, clay loams or clay | Extends from 10 to 60" | Var-ied | From on interbedded sandstone and shale |
| | Rockoutcrop | 30% of the mapping unit | and ridges | | | | 0-5 | | | | | |
| | Inclusions | 20% of the mapping unit | | | | | | | | | | |
| X106 | Tolman-Castner very stony sandy loams | 31 acres/1% | Moderately sloping to steep faulted | 10-30 | | | | | | | | Formed in place from weathered |
| | Tolman | 40% of the mapping unit | ridgeback slopes | | Shallow and well drained | Sandy loam | 6 | 6.1-7.8 | sandy clay loam to very gravelly | Extends to about 10-20" | 6.1-7.8 | sandstone |
| | Castner | 35% of the mapping unit | | | Shallow and excessively drained | Stony sandy loam | 5 | 6.6-7.8 | clay loam | | 7.6-8.4 | |
| | Inclusions | 25% of the mapping unit | | | | | | | | | | |

Table 4-1 SOIL DESCRIPTORS (cont.)

| MAPPING UNIT | | | | | | | SURFACE | | | SUBSURFACE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symbol | Name | Extent Composition % | Landscape Position | Slope % | Depth and Drainage Class | Texture | Depth (Inches) | pH | Texture | Depth (inches) | pH | Parent Material |
| X107 | Watrous-castner sandy loams | 166 acres/6% | Gently to strongly sloping upland | 5-15 | | | | | | | | |
| | Watrous | 50% of the mapping unit | ridges, watrous occurs on ridges while castner | | Moderately deep and well drained | Sandy loam | 4 | 6.6-7.8 | Gravelly sandy loam to sandy clay loam | Extends from 20-40" | 6.6-7.8 | Weathered sandstone residuum |
| | Castner | 30% of the mapping unit | occurs on sideslopes | | Shallow and excessively drained | Stony sandy loam | 10 | 6.6-7.8 | Fractured sandstone | Extends from 10-16" | 7.6-8.4 | Fractured sandstone |
| | Inclusions | 20% of the mapping unit | | | | | | | | | | |
| EL | Rockoutcrop | 17 acres/1% | Steep to very steep hillsides | 60-90 | Shallow and excessively drained | Varied | 0-5 | — | — | — | — | Sandstone and shale |

TABLE 4-2 SOIL LIMITATIONS

| Symbol | Name | Available Water Holding Capacity | Rate of Surface Runoff | Undisturbed Erosion Hazard | Erosion Factor K | Erosion Factor T | Surface Wind Erodibility Group | Shrink Swell Potential | Physical Limitations |
|---|---|---|---|---|---|---|---|---|---|
| 7C | Evanston loam | High | Medium | Moderate | .37 | 5 | 6 | Low to moderate | Fair source for topsoil and roadfill due to clay content and excessive lime. |
| 10D | Grail clay loam | Low | Rapid | Moderate from wind and high from water | .37 | 5 | 7 | Moderate | Heavy clay textures limit the use of this soil. |
| 10E | " | " | " | " | " | " | " | " | |
| 175D | Regent loam | Moderate | Medium | Moderate | .37 | 5 | 7 | High | Poor source for roadfill and topsoil due to shrink-swell potential. |
| 175E | " | High | " | " | " | " | " | " | |
| 17D | Work loam | High | Slow | Moderate | .37 | 5 | 5 | Moderate to high | Clay is the primary limitation for use of topsoil and roadfill. |
| 17E | " | " | Medium | High | " | " | | | |
| 19D | Campspass fine sandy loam | High | Medium | Moderate | .17 surface | 5 | 5 | Moderate to high | Poor source for topsoil due to the thin layer and poor for roadfill due to high clay content and shrink swell potential. |
| 19E | Campspass fine sandy loam | " | Rapid | High | .32 subsoil | " | " | | |

TABLE 4-2 SOIL LIMITATIONS (cont.)

| Symbol | Name | Available Water Holding Capacity | Rate of Surface Runoff | Erosion Hazard | Erosion Factor K | Erosion Factor T | Surface Wind Erodibility Group | Shrink Swell Potential | Physical Limitations |
|---|---|---|---|---|---|---|---|---|---|
| 32D | Yamac loam | High | Medium | Moderate | .32 | 5 | 5 | Low | Clay content is the largest limiting factor for this soil. |
| 61E | Hesperus loam | High | Rapid | High | .28-.32 | 5 | 3 | Low | Fair source for roadfill and topsoil, slope becomes limiting when greater than 15%. |
| 77D | Iles loam | High | Medium | Low | .24 Surface .37 Subsoil | 5 | 5 | Low surface high in subsoil | Poor source for topsoil due to fine textures, excessive line and shallow topsoil. Poor source for roadfill due to clayey textures. |
| X95E | Unnamed chamnery loam-rockoutcrop complex | Low | Medium | Low | .15 surface .17 subsoil | 3 | 8 | Low | Poor source for topsoil due to large stone content and slopes greater than 15 percent and poor source for roadfill due to thin layer of topsoil and steep slopes. |
| X95F | " | " | " | Low from wind and moderate from water | | | | | |

TABLE 4-2 SOIL LIMITATIONS (cont.)

| Symbol | Name | Available Water Holding Capacity | Rate of Surface Runoff | Erosion Hazard | Erosion Factor K | Erosion Factor T | Surface Wind Erodibility Group | Shrink Swell Potential | Physical Limitations |
|---|---|---|---|---|---|---|---|---|---|
| 101 | Torriorthents-rockoutcrop complex | | | | | | | | Shallow undeveloped soil and barren rock, very steep very shallow has severe limitations for any use. |
| | Torriorthents | Low | Moderate to rapid | High | | 1 | High | Low to high | |
| | Rockoutcrop | Very low | Very rapid | Very low | | | Low | — | |
| | Inclusions | | | | | | | | |
| 104 | Borolls-rockoutcrop complex | | | | | | | | |
| | Borolls | Low to high | Medium | Moderate from wind and high from water | | | Varied | Varied | Steep slopes and shallow depths of topsoil make this complex a poor source for roadfill and topsoil. |
| | Rockoutcrop | Low | Rapid | | | | | | |
| X106 | Tolman-castner very stony sandy loams | | | | | | | | This complex is a poor source for topsoil and roadfill due to shallow depth of soil and high content of coarse fragments. |
| | Tolman | Low | Medium | High | .32 surface | 1 | 3,5 | Low | |
| | Castner | " | Slow | " | .24 subsoil | " | " | " | |

TABLE 4-2 SOIL LIMITATIONS (cont.)

| Symbol | Name | Available Water Holding Capacity | Rate of Surface Runoff | Erosion Hazard | Erosion Factor K | Erosion Factor T | Surface Wind Erodibility Group | Shrink Swell Potential | Physical Limitations |
|---|---|---|---|---|---|---|---|---|---|
| X107 | Watrous-castner sandy loams | | | | | | | | This complex is a poor source for topsoil and roadfill due to shallow depth of soil and high content of coarse fragments. Watrous soil is further limited by high clay content in the subsoil. |
| | Watrous | Low | Slow | Moderate | .28 | 4 | 5 | Low | |
| | Castner | " | " | High | .24-.32 | 1 | 3,5 | " | |
| RL | Rockoutcrop | Very low | Very rapid | Very low | — | — | Low | — | Severe limitation for any use. |

4.2 Environmental Consequences

Surface mining the tract would modify the natural soil integrity on 750 acres in the strippable areas. An additional 350 acres on tract would be taken out of production by the construction of mine facilities, haul roads and topsoil and spoil stockpiles. By the end of the mine life, 1100 acres of soil would be disturbed by the proposed action (Map 2).

The surface mined pits would create the greatest reclamation problems resulting from the handling of the topsoil and introduction of new parent materials. The disturbance of soil on the mine site would result in soil losses from wind and water erosion but the quantities would be insignificant because of Federal and State reclamation regulations.

Anticipated impacts involve the loss of the natural soil integrity and diversity. The soil handling and mixing of soil horizons would modify soil structure, texture, permeabilty, infiltration rates, effective rooting depths, soil microclimates and the nutrient and energy cycling. These impacts are not considered significant.

Soils with poor reconstruction potential have shallow topsoil (a horizon less than 12 inches thick: 77D, X95E & F, 101, 104, X106, X107) on 56% of the disturbed area. Very fine, heavy clay-loam subsoils occur on 21% of the disturbed area (10D & E, 17SD & E, 17D & E, 19D & E).

Although these soil limitations are considered normal for the area, to achieve successful reclamation, practices to alleviate the above mentioned limitations

would need to be addressed in the reclamation plan. These practices could consist of mechanical means of regrading to create surface slopes which are stable and amenable to farm equipment that are required to complete the revegetation process. Areas of deeper soils would probably be insufficient for a borrow source. Based on this analysis, to establish vegetation on the areas of shallow topsoil, considerable amounts of suitable overburden may be required to meet depth requirements, together with material from areas of deeper soils, that would be disturbed. Based on present information these two practices would provide sufficient plant growth media for all disturbance on tract and sufficient overburden and/or excess topsoil areas are available. One way to alleviate the problem of fine textured subsoil is to avoid mixing it with the topsoil during the removal process.

The loss of soil microbiota numbers and diversity can be altered by topsoil stockpiling. Changes in the nutrient cycling could be a concern if the following acceptable reclamation practices were not utilized. The application of organic fertilizer, shortening the period of stockpiling and innoculation of adapted strains of microbiota are three possible ways to maintain a viable population of microbiota in the soil.

Due to the regulations which require the soils to be reclaimed to the same productivity or better than before mining, the soil limitations on tract would be mitigated. This would be approximately 10 years after the last cultural practice. The impact of the poor reclamation potentials would not be to the soil community, due to regulations, but to the lessee through the cost and difficulty of reclamation, primarily from the handling of topsoil.

### 4.2.2 Short Term vs. Long Term Productivity

All of the disturbed area would be returned to a productive state after the mine life. The alteration of the soil profiles and loss of soil erosion cannot be avoided.

### 4.2.3 Irreversible and Irretrievable Commitments for Soils

Complete alteration of the soil horizons can be considered irreversible. Some loss of the topsoil is inevitable on the disturbed area because of wind and water erosion. The lost soil would be irretrievable but soil treatments and grading are expected to mitigate this impact.

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: #1 Surface Mine

| Resource Element | Committed Mitigation | Anticipated Impact: Baseline (1985) | 1992 | 1995 | 2000 | EML (2005) | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Prime and Unique Farmlands | USDA, SCS, Public Law 45-87, Section 657.5 | None | → | → | → | → | Good, SCS Moffat Co. Soil Survey Report | None | None |
| Soils | | | | | | | | | |
| Erosion potentials | Federal (OSM, SMCRA), State (CMLRB), and local reclamation regulations | 3 tons/ac/yr | 105 Ac | 252 Ac | 497 Ac | 1100 Ac | Good, the universal soil loss equation | Erosion rates of 10-15 ton/ac/yr. Soil lost from the site would be irretrievably displaced. | Disturbed and unprotected sites on steep slopes may be severely eroded. The impact may be lessed by regulations. Insignificant impact. |
| Chemical limitations | Federal (OSM, SMCRA), State (CMLRB), and local reclamation regulations | None | → | → | → | → | Good, SCS Form 5's | | Inoculate the soil with adapted strains of soil microorganisms and keep heavy clay subsoils and overlurden unsuitable for plant growth separated from the topsoil are methods that could be used. |

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: #1 Surface Mine

| Resource Element | Committed Mitigation | Anticipated Impact Baseline | 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Physical limitations | Public law 95-87 Federal (OSM, SMCRA), state (CMLRS), and local reclamation regulations | Shallow soils Steep slopes fine texture subsoils | 81 | 194 | 383 | 847 Ac | Good SCS soil survey report | | Mechanical means of amending the steep slopes to farm equipment would be required and lessee must find source of plant growth media to revegetate areas of shallow topsoil. |
| Physical profile | Federal (OSM, SMCRA), state (CMLRS), and local reclamation regulations | Fair to good | 105 Ac | 252 Ac | 497 Ac | 1100 Ac | Good | Loss of natural soil integrity and diversity - modification of structure, texture, permeability, infiltration, rooting depths, microclimate, and nutrient/energy cycling. | Keep topsoil separate from subsoil and overburden. The impact is insignificant. |
| Suitability as plant growth media | Federal (OSM, SMCRA), state (CMLRS), and local reclamation regulations | Fair to good | 0 Ac | ——→ | ——→ | ——→ | Good | | Suitable overburden may be used or material from areas of deeper soils to provide suitable plant growth material for the disturbed areas. |

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: #1 Surface Mine

| Resource Element | Committed Mitigation | Anticipated Impact Baseline | 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Availability of plant growth media | Federal (OSM, SMCRA), state (CMLRB), and local reclamation regulations | Poor to good | | | | | Good | | Adequate plant growth media would be available. |
| Occurrence of toxic elements | Federal (OSM, SMCRA), state (CMLRB), and local reclamation regulations | Unknown | 0 | ——→ | ——→ | ——→ | | | If any toxic elements occur, they would be buried below the rooting zone. The possibility is expected to be low. |

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: #1 Surface Mine

| Resource Element | Committed Mitigation | Anticipated Impact | | | | | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| | | Baseline | 1992 | 1995 | 2000 | EML | | | |
| Land Use Planning Stipulations | | None | ——> | ——> | ——> | ——> | Good | | |
| Proposed Mitigation | | None | ——> | ——> | ——> | ——> | Good | | |

Tract Name or Number: Ilex Mountain

State: Colorado

Leasing/Development Scenario: #1 Surface Mine

| Resource Element | Committed Mitigation | Baseline | Anticipated Impact 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Reclamation Potential | | | | | | | | | |
| Potential back to present use | Federal (OSM, SMCRA), state (CMLRB), and local reclamation regulations | Fair to good for entire tract. | 0 | → | → | → | Good | | Reclamation regulations. Portions of the tract have limitations although the entire tract is fair to good. |
| Potential back to other uses | Federal (OSM, SMCRA), state (CMLRB) and local reclamation regulations | Dryland farming and cattle grazing | Unknown | → | → | → | | | |

# 5. Water Resources

## 5.1 Affected Environment

### 5.1.1 Ground Water

Ground water on the tract occurs under perched conditions in the shallower bedrock aquifers that underlie the upland areas above the levels of Sulphur Gulch and Ralston Draw. The shallow bedrock aquifers consist of thinly interbedded, very fine to fine-grained sandstones, siltstones, and coal beds. This type of aquifer typically is laterally discontinuous and extends downdip from outcrop, but generally has low and highly variable water yields. The annual precipitation is about 20 inches and supplies recharge to the shallow aquifers in the upland areas. The Twentymile Sandstone outcrops in the northwest portion of the tract north of the E 1/4 corner of Section 15, dips to the north, and is deeply incised along the east slope of Ralston Draw and the west slope of the draw that drains north through Section 14. Groundwater movement is generally northward downdip with discharge occurring along the steep side slopes of the incised draws that drain the dissected dipslope surface.

Post Oak Spring in the northeast corner of the tract flows about 3 gallons per minute (gal/min). All other seeps on the tract are too small to appear at the surface as springs, but their location is typically indicated by local patches of verdant vegetation.

Confined (artesian) conditions undoubtedly occur in aquifers below the level of the principal stream valleys, but little is known about the occurrence of water in these deeper aquifers except that the potentiometric surface of the uppermost confined aquifer apparently slopes northward toward the Yampa River Valley at a gradient of about 125 to 150 feet per mile (ft/mi).

Alluvium supplies water to one well near the head of Sulphur Gulch and may carry a small amount of underflow in Ralston Draw, but elsewhere on the tract, alluvium is not an aquifer. Data for wells and springs in and adjacent to the tract are summarized in Table 5-1.

Total ground water discharge from the tract probably does not exceed 10 gal/min or about 16 acre-feet per year (ac-ft/yr).

Water in the alluvium contains about 750 milligrams per liter (mg/l) dissolved solids and is probably a calcium, magnesium, sulfate type. No data is available for water quality in the bedrock aquifers underlying the tract, but data from adjacent areas indicate that water in the shallow bedrock aquifers is probably a calcium, magnesium, sulfate, bicarbonate type containing 500 to no more than 1500 mg/l dissolved solids whereas water in the deeper confined aquifers is probably a sodium, bicarbonate, sulfate type containing no more than 1000 mg/l dissolved solids.

### 5.1.2 Surface Water

Included within the boundaries of the tract are parts of eight small

TABLE 5-1

DATA FOR WELLS AND SPRINGS ON AND ADJACENT TO THE ILES MOUNTAIN TRACT

| Well No. | Location 1/ | Depth (feet) | Depth to Static Water Level (feet) | Aquifer | Specific Conductance (umhos/cm) | Dissolved Solids (mg/l) | pH | Use |
|---|---|---|---|---|---|---|---|---|
| 1 | 5-92-13 BDA | Spring | -- | Ki 2/ | -- | -- | -- | Livestock and wildlife |
| 2 | 5-92-15 CBA | 92 | 30 | Ki | -- | -- | -- | Livestock and wildlife |
| 3 | 5-92-22 DBB | Spring | -- | Qal 3/ | -- | -- | -- | Livestock and wildlife |
| 4 | 5-92-25 AAC | 17 | 6.9 | Qal | 1,050 | 735 4/ | 7.3 | Unused |

1/ Refers to standard USGS well-numbering system.
2/ Ki, Iles Formation.
3/ Qal, alluvium.
4/ Approximate value obtained by multiplying specific conductance by 0.7.

watersheds. Five drain northward to the Yampa River, two drain northeastward to the Williams Fork River, and one drains southwestward to Stinking Gulch. All streams are ephemeral and only Sulphur Gulch and Ralston Draw show any indictions of shallow ground water. Channel gradients are moderately steep, averaging 125 to 150 ft/mi.

No data is available on surface runoff from the tract. Of seven small reservoirs on the tract, two were dry at the time of the field examination (August, 1979), and the remaining five were almost dry. It is estimated that annual runoff in this general area is between 0.5 and 1.0 inch or about 150 to 300 ac-ft/yr from the entire tract. Peak discharges during a 100-year flood would be less than 100 cubic feet per second (cfs) on all channels except Ralston Draw, which could have a peak flow of as much as 475 cfs.

Water in the reservoirs on the tract indicates that surface runoff is probably a calcium, magnesium, sulfate type and contains 125 to 350 mg/l dissolved solids.

5.1.3 Erosion and Sedimentation

The tract as a whole appears to be moderately stable. Many valley bottoms are actively aggrading (accumulating sediment) or channels are stabilized by a protective plant cover or by coarse-grained alluvium. Annual sediment yield from the tract is estimated to be 0.2 to 0.4 acre-feet per square mile (ac-ft/sq mi).

5.1.4 Alluvial Valley Floors

No alluvial valley floors occur on or adjacent to the tract. The closest alluvial valley floor is the Yampa River Valley a quarter of a mile north of the tract.

5.1.5 Floodplains

Two floodplains occur within the tract boundaries. Ralston Draw is located in Section 15 (W 1/2 SW 1/4) and Section 22 (W 1/2 NE 1/4 NW 1/4). Post Oak Draw is in Section 19 (NW 1/4). Both draws drain north off tract into the Yampa River. The designation as floodplains is based on criteria of their channel characteristics and the potential for substantial harm to people and/or property.

5.2 Environmental Consequences

5.2.1 Ground Water

Little or no inflow to the pit would occur during the construction and initial phases of mining. Inflow may increase slightly as the pit progresses downslope in the western part of the tract. Calculations show that the groundwater table would be about 190 feet below the surface at the northern end of Pit 1 (Sec. 10: NW 1/4 NE 1/4 NE 1/4) if the potentiometric surface of the Twentymile Sandstone is graded to the Yampa River at a gradient of 150 ft/mi. Since the mining depth is to be about 200 feet, artesian groundwater

would prove to be insignificant.

Perched groundwater may occur as pockets in irregularities in the surface at the base of the Twentymile Sandstone. The quantity of water in these pockets, as well as other minor aquifers in the overburden would contribute minor amounts of water to the pit.

Water discharging from the spoils aquifer after reclamation is expected to contain about 2500 mg/l dissolved solids because of leaching of the spoils materials. Although this water should be a calcium, magnesium, sulfate type suitable for use by livestock and wildlife, the increased salt load to the Yampa River over the long term would be about 150 tons/yr which is insignificant.

The wells in section 15 and section 25 should not be impacted. Post Oak Spring in section 13 could have reduced discharge as a result of mining but potential is equally good that the flow might increase or that one or more new springs may occur upslope near the northern limit of mining. The spring in section 22 should not be impacted by mining. Wells drilled in the reclaimed mine areas may be up to 150 feet deeper, because perched water tables, that may have been present in the overburden (prior to mining), have been replaced with backfilled spoils. The spoils aquifer would lack confining layers and develop a water table that may be much deeper than a premining perched water table.

5.2.2 Surface Water

Impacts to the surface-water system (including quality) in and adjacent to the tract both during and after mining should be very minor (see 2A). Net water yield to the Yampa River from the tract should be reduced by no more than about 25 percent (40 to 75 ac-ft/yr) during mining, primarily because of use of surface runoff retained in reservoirs and sedimentation ponds for dust control. Runoff should return to approximately premining rates after reclamation. Little or no change in water yield should occur to the Williams Fork River as virtually all mining would be in that part of the tract that drains northward to the Yampa River.

Surface water runoff is expected to have a slight increase in total dissolved solids during mine life, but is anticipated to return to premining quality after reclamation is completed.

Only one reservoir would be removed by mining. Sedimentation ponds should provide an alternate water source for livestock and wildlife during mining. Once reclamation is complete and sedimentation ponds removed, the reservoir should be rebuilt as a water source for postmining livestock and wildlife use.

Peak discharges in the mined area should present no serious flooding hazards.

5.2.3 Erosion and Sedimentation

Sedimentation ponds required by 30 (CFR): 816.42 to meet established effluent

standards would reduce sediment yield from areas disturbed by mining to an acceptable level (insignificant).

### 5.2.4 Floodplains

Based on field examination, estimated low flood peak stage, lack of property, no threat to loss of life, and low natural and beneficial uses of these floodplains, it has been determined that both floodplains identified in the 1979 ~~amendment~~ supplement as unsuitable, should be suitable for coal development. Therefore, there are no significant floodplains on tract.

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Anticipated Impact: Baseline | 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Surface Water Type of Occurrence | All stream channels would be reconstructed to state and federal regulations | All streams on tract are ephemeral | Slight decrease in surface runoff | → | → | → | Field observation and U.S. Geological Survey 7 1/2' topographic maps | | Insignificant problems are anticipated |
| Quantity | Comply with state and federal requirements | Runoff from tract averages 0.5 to 1.0 inch per year or about 150 to 300 ac-ft/yr. | Runoff to Yampa River should not change signifi-cantly | | | | Inferred from field observations and results of similar mining operations in northwestern Colorado | Minor impact, runoff would decrease slightly due to increased infiltration in mined spoils | |

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Baseline | Anticipated Impact 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Quality | Comply with state and federal requirements | Water in reservoirs indicates that runoff contains 125-350 mg/l dissolved solids | No significant effect slight increase in dissolved solids | → | → | → | Inferred from field observations and water quality measurements in reservoirs on the tract | Minor and short term, runoff should return to approximately premining quality | No acid water problems are expected as a result of mining |

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Anticipated Impact: Baseline | 1992 | 1995 | 2000 | EVL | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Surface Water Salinity of receiving waters (Yampa River) | Comply with state and federal water quality requirements and NPDES permit | No salinity problem in Yampa River | Slight increase due to population and use in mining | ——→ | ——→ | Salinity would increase in relation to the amount of increased infiltration to the spoils aquifer and the amount of discharge from the aquifer | Based upon inferred population increase, use in mining and long term leaching of spoils aquifer | Increase in salinity, although only a minor impact. Effects would be long term. Salt load may increase by 150 tons/yr. | Principal cause of long term increase in salinity is leaching of spoils in reclaimed area. |
| Importance to livestock and wildlife | | Seven small reservoirs on tract provide seasonal water for livestock and wildlife | Only one reservoir would be removed by mining | ——→ | ——→ | ——→ | Field observation | None | Reservoir could be replaced after reclamation, if desired through stipulations |

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Anticipated Impact: Baseline | 1992 | 1995 | 2000 | EOL | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Surface Water Importance to industry | | All agriculture on and adjacent to the tract is dryland farming | None | → | → | → | Field observation | None | |
| Importance to people | | Surface runoff from the tract is not used for individual or municipal supplies | None | → | → | → | Inferred from field observation and water rights filings | None | |
| Erosion and sediment action | Comply with state and federal requirements | Tract appears to be moderately stable. Estimated sediment yield is 0.2-0.4 ac-ft/sq mi/yr. | Slight increase less than 0.1 ac-ft/sq mi/yr | → | → | Insignif-icant. Long term sediment yield would probably be no more than the preamining rate | Field observations | None | |

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Anticipated Impact | | | | | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| | | Baseline | 1992 | 1995 | 2000 | EML | | | |
| Floodplains and wetlands | Federal Land Policy Management Act - BLM, EO-11988 | Ralston Draw and Post Oak Draw | None | ——> | ——> | ——> | U.S. Geological Survey 7 1/2' topographic maps and field observation | None | See narrative. |
| Alluvial valley floors | PL 85-97 Surface Mining and Reclamation Act 1977 | None on tract | None | ——> | ——> | ——> | " | None | |

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Anticipated Impact Baseline | 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Groundwater Types of occurrence (aquifers) | | Perched conditions in bedrock aquifers above level of Sulfur Gulch and Ralston Draw and confined (artesian) conditions below that level small amount of unconfined water locally in alluvium. Most alluvium dry. | Yields in springs in sections 13 and 11 may fluctuate Well in section 15 should not be affected | ——→ | ——→ | Future wells in the mined area may need to be 150 feet deeper with correspondingly higher pumping lifts. New springs may form at lowest elevation of spoils at north side of the tract | Inferred from field observations, well data and geology of tract | Bedrock aquifers in mined areas would be replaced with more permeable spoils aquifers. Perched conditions in mined areas and confined conditions in western part of tract would be replaced by unconfined conditions. Springs on tract and in area may have yields increased or decreased depending upon connection with recharge. | The combined yield of possible new springs probably would not exceed 50 gal/min (80 ac-ft/yr). Water well in section 15 in Ralston Draw should have no significant effects placed on it. |

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Anticipated Impact Baseline | 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Groundwater Quantity | Comply with state and federal regulations | Springs and wells on the tract yield less than 6 gal/min. Total groundwater discharge from the tract is estimated to be no more than 10 gal/min (16 ac-ft/yr). | Springs and wells may fluctuate | ——→ | ——→ | New springs are expected to appear in northern end of tract due to increased permeability of spoils | No quantitative data are available for this area conclusions inferred from field observations and geology of tract. | Aquifer system on tract would be altered, yields are expected to increase from springs along with possible new springs in northern end of spoils | Post mining discharge from tract is expected to be about 65 ac-ft/yr more than before mining because of greater permeability of spoils |

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Anticipated Impact Baseline | 1992 | 1995 | 2000 | EOL | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Groundwater Quality | Comply with state and federal water quality requirements and NPDES permit | Shallow bedrock aquifers and alluvium probably yield calcium, magnesium, sulfate, bicarbonate water containing 500 to 1500 mg/l dissolved solids. Deeper aquifers probably yield sodium bicarbonate, sulfate water containing no more than 1000 mg/l dissolved solids | Slight increase in dissolved solids from mining disturbance and spoils pile | → | → | Leaching of spoils aquifer would probably increase dissolved solids concentrations in the mined area to about 2500 mg/l | Inferred from similar operations of other mines in northwestern Colorado | Should have no significant effect on use of water by livestock and wildlife | See salinity of surface water |

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Anticipated Impact: Baseline | 1992 | 1995 | 2000 | EOL | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Groundwater Importance to livestock and wildlife | Augmentation plan submitted by mining company to state of Colorado and BLM mine plan stipulations | One spring and one water well supply water for livestock and wildlife | Post Oak Spring yields may fluctuate | ——→ | ——→ | New springs with higher dissolved solids are expected to surface in northern part of mined area | Field observations | Any interrupted supplies could be replaced by deeper wells | |
| Importance to people | " | Groundwater from tract is not used for individual or municipal supplies | None | ——→ | ——→ | ——→ | " | None | |

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Baseline | Anticipated Impact 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Importance to industry | " | Ground water from the tract is not used for industry or agriculture | None | → | → | → | Field observations and water rights filings | None | |

## 6. Vegetation

### 6.1 Affected Environment

The tract consists of 2,847.37 acres. There are a number of ecological range sites present on the tract (see Figure 6-1). A range site is defined as a type o rangeland with inherently different soil characteristics that produce a significantly different kind or amount of potential vegetation. Production values are epxressed on a dry weight basis. A discussion of each of these follows:

The "mountain loam/brushy loam complex" is characterized by alluvial-colluvial slopes, terraces, and valleys of elevations from 6800 to 7500 on the tract. Slopes average 10-15%, but often reach 30 to 50%. The soils are fairly deep and have a good water holding capacity. A large percent of the soil moisture is available for plant growth. The site is generally treeless, although within the boundaries of the tract there are a few areas with Quercus gambellii (Gambel's oak) present. The dominant shrub is Artemisia tridentata (big sagebrush) on nearly all of the mountain loam/brushy loam sites in the tract. Other shrubs found to be present are Symphoricarpos sp. (snowberry), Chrysothamnus sp. (rabbitbrush), and Amelanchier sp. (serviceberry). The dominant grasses are the bluegrasses (Poa secunda and Poa pratensis) and the needlegrasses (Stipa comata and Stipa viridula). Other grasses in lesser or trace amounts are Agropyron sp. (wheatgrasses), Sitanion hystrix (squirreltail), Bromus marginatus (mountain brome) and Koeleria cristata (junegrass). The principal forbs are Balsamorhiza saggitata (arrowleaf

balsamroot), Lupinus sp. (lupine), Achillea lanulosa (western yarrow) and Perideridia gairdeneri (yampa). The composition, by weight, of the site is 50 to 60% shrubs, 10 to 35% grasses and 10 to 28% forbs. The total estimated annual production of the community ranges from 1,100 to 3,200 pounds per acre and the ecological condition of the site is generally good. The complex consists of 1210.99 acres of the tract, or 42.53%.

The "mountain loam" site is similar to that of the mountain loam/brushy loam complex in both topography and soil characteristics. The mountain loam areas show big sagebrush being more dominant, with little to trace amounts of serviceberry and no Gambel's oak. The dominant grasses are wheatgrasses and bluegrasses. The forbs present in these areas are arrowleaf balsamroot, lupine and Lithospermum sp. (stoneseed). The shrubs make up 50-55% of the composition by weight, while grasses make up 35% and forbs 10-15%. The estimated total annual production of the mountain loam site ranges from 1100 to 2000 pounds per acre, and the ecological condition of the site is good. The mountain loam consists of 225.51 acres of the tract, or 7.92%.

The "deep clay loam" site is characterized by gently sloping to steep hills and valleys. The soils are deep, with loam or clay surface layers. They are slowly permeable and waterholding capacity is high. When the ground is dry, the soil surface cracks, indicating high shrink-swell properties. By weight 65% of the composition is shrubs, with big sagebrush being the dominant. Other shrubs in the site are snowberry and serviceberry. Grasses make up approximately 25% of the composition with Stipa lettermanii (lettermans needlegrass) being dominant. Other grasses present are bluegrasses,

wheatgrasses, and mountain brome. The estimated total annual production of the deep clay loam is 2,200 pounds per acre, and the ecological condition of the site is a high-fair. The vegetation displays moderate utilization, with heavy utilization, below five feet, of the scattered Gambel's oak by deer and cattle. The site consists of 28.76 acres of the tract, or 1.01%.

"Loamy slopes" occur on moderate to steep stony slopes. The elevation ranges from 6500 to 7500. The soils are a moderately deep, stone-filled loam. Moisture holding capacity is low due because of the stoniness, and permeability is moderate. Stones in the soil profile are favorable to plant growth by increasing the water available in a given volume of soil. The vegetation consists of 60-65% shrubs (dry weight), big sagebrush being dominant. This is a browse-grass plant community, therefore, Purshia tridentata (antelope bitterbrush), Cercocarpus montanus (mountain mahogany) and serviceberry are present as well. By weight 25 to 35% of the community is grass, with Agropyron spicatum (bluebunch wheatgrass) and Stipa comata (needle and thread) being dominant. Other grasses occuring in smaller amounts are Poa pratensis (Kentucky bluegrass), Bromus tectorum (cheatgrass) and squirreltail. The principal forbs are arrowleaf balsamroot, Eriogonum sp. (buckwheat) and Phlox sp. which make up 5-10% of the community. The estimated total annual production is approximately 1,000 pounds per acre, and the ecological condition of the site is high-fair to good. The vegetation displays moderate utilization, and an abundance of browse. The loamy slopes make up 336.27 acres of the tract, or 11.81%.

The "stony foothills" are rough, rocky breaks on steep slopes up to 65%. The

soils are rocky and of various depths. This stony nature of the soil is favorable to the plant growth-soil moisture relationship. Heavy runoff during periods of intense rain may occur, but only slight erosion results when the range condition is good. The site is a grassland plant community with a small amount of shrubs, and two inclusions; one of Pinus edulis (pinyon)/Juniperus sp. (juniper), and one Quercus gambellii (Gamebel's oak). Shrub composition is 20-35% by weight, with big sagebrush being dominant. Other shrubs present are Chrysothamnus sp. (rabbitbrush), mountain mahogany and trace amounts of serviceberry. Grasses make up from 40 to 60% of the composition by weight, with the wheatgrasses being dominant. Other grasses present on the tract are Bromus tectorum (cheatgrass), Koeleria cristata (junegrass), and Poa sp. (bluegrasses). The principal forbs are balsamroot, Happlopappus sp. (goldenweed), Phlox sp. (phlox) and Opuntia sp. (prickly pear cactus). Forbs make up approximately 15% of the site by weight. The total annual production of the stony foothills site is 100-500 pounds per acre, and the ecological condition of the site is poor to fair. The areas consist of 780.75 acres, or 27.42% of the tract.

The "sandy foothills" site appears to be an old river terrace. The soils are deep sandy loams to loamy sands. They have a poor water holding capacity, but take water rapidly and, therefore, are favorable for plant growth. Shrubs make up 57% of the community by weight, with big sagebrush being dominant with smaller amounts of rabbitbrush. Grasses make up 40% of the community, by weight. The three dominant grasses are needle and thread, wheatgrass and cheatgrass. Forbs only make up 3% of the site with Opuntia polyacantha (prickly pear) and Lithospermum sp. (stoneseed) being dominant. The site

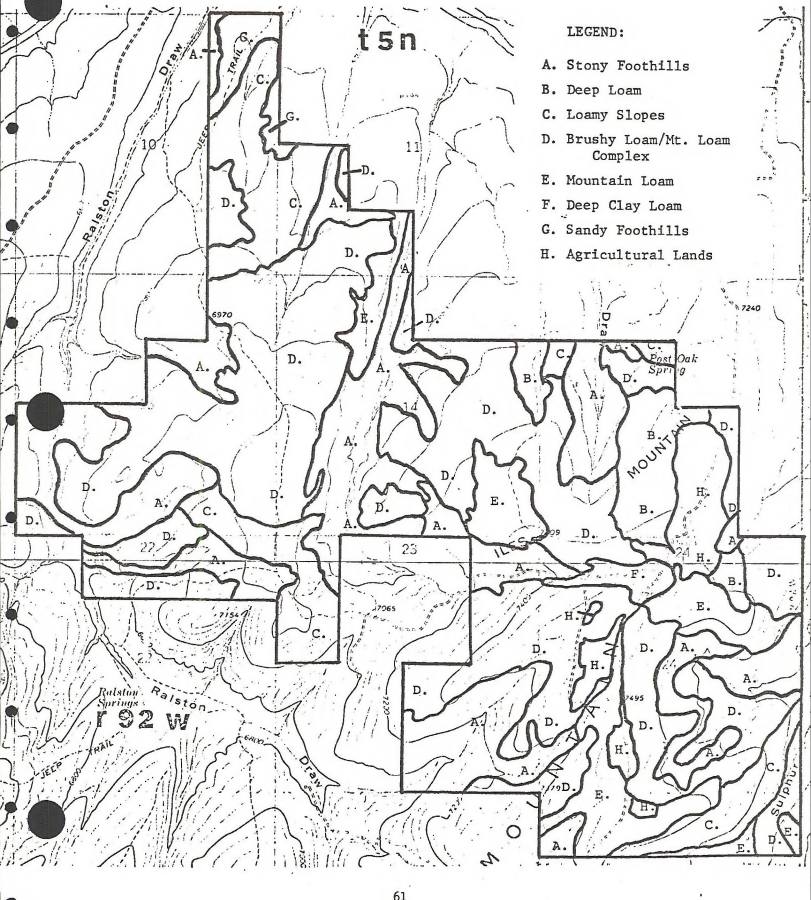
displays heavy livestock utilization with decreasing plant vigor. The estimated total annual production is 800 pounds per acre, and the site is in a low-good ecological condition. The sandy foothills consists of 42.71 acres or 1.5% of the tract.

The "deep loam" site consists of uplands varying from gentle slopes to fairly steep hillsides, ranging from 0-65%. The soils are moderately deep and are favorable for plant growth. By weight 65 to 75% of the site is composed of shrubs, 20-30% of grasses, and only 5% forbs. The dominant shrubs are big sagebrush, rabbitbrush and serviceberry. Snowberry is also present. The principal grasses are the bluegrasses and western wheatgrass (Agropyron smithii). Other grasses on the site in somewhat smaller amounts are needle and thread, Elymus sp. (wildrye), and Stipa viridula (green needlegrass). The forbs present are arrowleaf balsamroot, buckwheat, lupine and Allium sp. (onion). The estimated total annual production of this deep loam site is 1,100 pounds per acre, and the site is in a low-good ecological condition. There is evidence of heavy utilization by cattle. The deep loam consists of 122.72 acres or 4.31% of the tract.

The remaining 99.66 acres of the tract is either agricultural land or seeded pasture. The major crop is dryland wheat under a two-year rotation system with every other year in fallow. The yields range from 12-15 bushels per acre in a poor year to as much as 40 bushels per acre in a good year. The dryland wheat produces about 26 bushels per acre in an average year. The seeded pastures are intermediate wheatgrass (Agropyron intermedium) or Agropyron cristatum (crested wheat). By weight 65% of the composition is grasses and

30% shrubs. Big sagebrush is the dominant shrub. Total estimated annual production is about 1,000-1,200 pounds per acre. The agricultural and seeded areas make up 3.5% of the tract (see Section 13.2 Lands for discussion).

VEGETATION MAP



6.1.1 Threatened, Endangered and Sensitive Plants

A field survey of the tract was conducted by the Bureau of Land Management in August of 1982. No known threatened, endangered or sensitive plant species were found on the tract at that time.

6.2 Environmental Consequences

The loss of the native vegetation due to the surface facilities, topsoil piles, spoil piles, and mining pits is approximately 1100 acres (Map 2). This loss of native vegetation is insignificant due to post mining reclamation regulations, although species diversity would be somewhat altered within the tract due to disturbance and subsequent reclamation. When the use of the vegetation is considered the impact could be significant (see section 13, Land Use).

6.2.2 Threatened, Endangered and Sensitive Plants

As there were no endangered species identified on the tract, there would be no impact to these species.

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: Surface Mine

| Resource Element | Committed Mitigation | Baseline | Anticipated Impact 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Vegetation | | Acres | | | | | | | |
| A. Stony foothills | | 780.75 | 28<br>5 | 68<br>11 | 136<br>22 | 301<br>47 | Fair | | |
| B. Deep loam | | 122.72 | 12 | 30 | 59 | 130 | | | |
| C. Loamy slopes | | 336.27 | 45 | 107 | 212 | 468 | | | |
| D. Brushy loam/ mt. loam comm. | | 1210.99 | | | | | | | |
| E. Mt. loam | | 225.51 | 8 | 20 | 39 | 87 | | | |
| F. Deep clay loam | | 28.76 | 1 | 3 | 5 | 11 | | | |
| G. Sandy foothills | | 42.71 | 2<br>4 | 4<br>9 | 7<br>17 | 17<br>39 | | | |
| H. Agricultural | | 99.66 | | | | | | | |
| | | | 105 | 252 | 497 | 1,100 total | | | |

## 7. Wildlife

### 7.1 Affected Environment

#### 7.1.1 Habitats

Habitat types occurring on this 2,767 acre tract are sagebrush (69%), grassland (27%) and cropland (4%). These types provide important food and cover necessary to maintain deer and elk reproduction and winter survival. Cliffs provide raptor nest sites (see Map 7-1).

#### 7.1.2 Populations

Mule deer and elk are the major big game species inhabiting this tract. An estimated 204 deer and 62 elk use the area. These estimates are based on 10 year averages of numbers of animals on winter ranges.

A fawning area, migration route, and winter range for mule deer are within the tract. A calving area and critical winter range for elk occur.

Golden eagles and red-tailed hawks nest on and near the tract. Six eagle nests and two hawk nests occur.

#### 7.1.3 Threatened and Endangered Animals

Bald eagles winter along the Yampa River north of the tract. They may hunt on

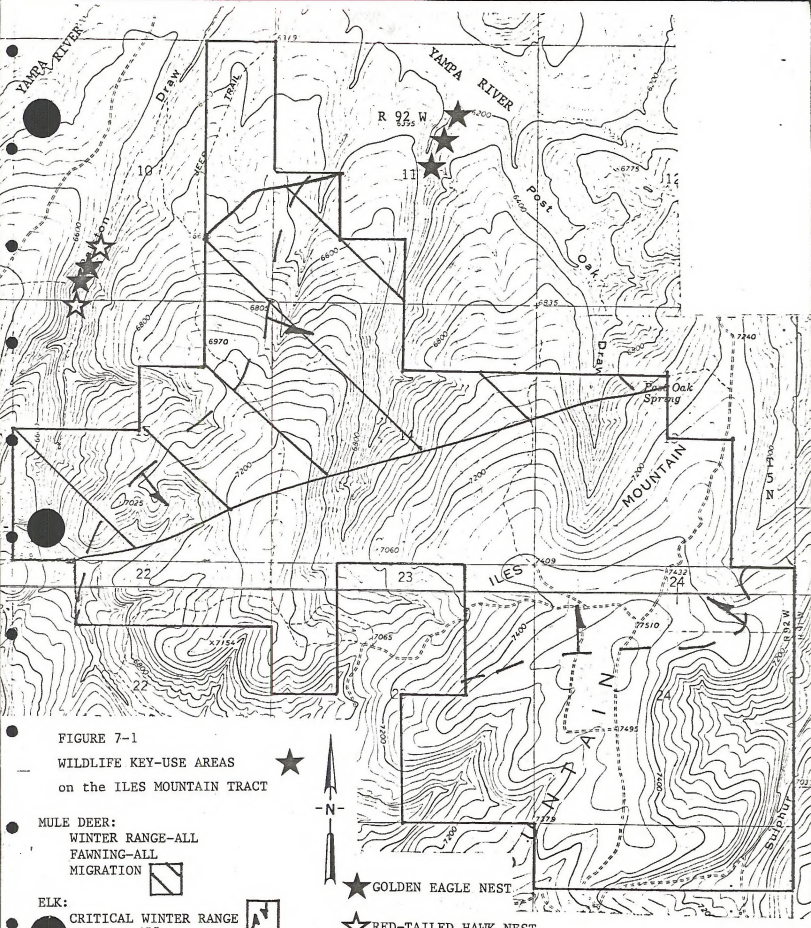



FIGURE 7-1

WILDLIFE KEY-USE AREAS

on the ILES MOUNTAIN TRACT

MULE DEER:

WINTER RANGE-ALL

FAWNING-ALL

MIGRATION

ELK:

CRITICAL WINTER RANGE

CALVING -ALL

SCALE: 1:24,000

the tract, but not roosts or nests are known to occur. Numbers are not known, as surveys have not been conducted.

7.1.4 Wild Horses

None occur.

7.1.5 Land Use Planning Stipulations

The Williams Fork Management Framework Plan Amendment 1979 provides for mitigation of big game critical winter ranges lost due to surface mining and subsurface mining disturbance. The following stipulation would apply to the 1100 acres on the tract.

The lessee shall be required to mitigate for mule deer and elk habitat loss and the resultant loss or displacement of this species, as a key indicator species, due to coal mining operations. The lessee shall be required to submit for approval to the Authorized Officer a habitat recovery and replacement plan for protection or enhancement of the deer and elk population affected by habitat loss or displacement from historic habitat.

The habitat recovery and replacement plan shall be developed in consultation with the Authorized Officer and the Colorado Division of Wildlife (CDOW) based on estimates of lost and disturbed habitat as described in this document. If the mine plan submitted by the lessee indicates figures different from the lost habitat estimates used in this document as to quality and quantity of

habitat lost or disturbed, mitigation alternatives shall be recalculated based upon revised data contained in the mine plan.

The final habitat recovery and replacement plan shall indicate the methods to be employed by the lessee which will ensure that the carrying capacity of the recovered or replaced land has the capacity to support this indicator species as agreed upon by the Authorized Officer and CDOW.

Mitigation methods may require the lessee to employ techniques for wildlife range manipulation or intensive wildlife range management. Habitat recovery may not be completely feasible in the permit area; therefore, recovery or replacement may be accomplished on lands made available through the surface management agency, the state, or the lessee outside the permit area in combination with recovery and replacement methods on suitable lands within the permit area.

The habitat recovery and replacement plan shall include the following:

1. A habitat analysis of the permit area which:

   a. identifes the above species which occupy the permit area, and
   b. includes an analysis of the quality or carrying capacity of the habitat for this species.

2. A detailed description of the methods selected by the lessee to mitigate habitat loss, together with a comparative analysis of alternate methods

which were considered and rejected by the lessee and the rationale for the decision to select the proposed methods.

The methods utilized by the lessee for recovery and replacement may include, but are not limited to, the following techniques:

a. Increasing the quantity and quality of forage available to wildlife.
b. The acquisition of critical wildlife habitats.
c. Mechanical manipulation of low quality wildlife habitat to increase its carrying capacity for selected wildlife species.
d. Recovery, replacement or protection of important wildlife habitat by selected fencing.

3. A timetable giving the periods of time which will be required to accomplish the habitat recovery or replacement plan and showing how this timetable relates to the overall mining plan.

4. An evaluation of the final plan by CDOW. The state shall comment on the methods selected and the techniques to be employed by the lessee and may recommend alternate recovery or replacement methods. If the state has recommended an alternate method, the lessee shall consider the state's recommendation and, if the lessee rejects the state's plan, the lessee shall indicate its reasons as required by provision 2 above. If no state comment is included in the plan, the lessee shall verify its consultation with the state, and the plan may be considered without state comment.

Buffer zones for the golden eagle nesting and bald eagle wintering areas have been delineated as unsuitable in the Williams Fork Management Framework Plan Coal Amendment Update 1982. All but one area has been deleted from inclusion within the tract. This one area is located in T. 5 N., R. 92 W., Section 23, W 1/2 SE 1/4.

This area would be protected with the following lease stipulation: no surface occupancy between February 1 and July 31 to protect nesting eagles.

7.2 Environmental Consequences

7.2.1 Habitats

Mining and associated facilities would disturb 1,100 acres of big game habitat. These impacts would be minimized by committed mitigation. See Section 7.1.5. These mitigating measures would increase food and cover on undisturbed portions of the tract or possibly off-tract, if needed. This increases in habitat quality would compensate for lost habitats while mining continues. The effectiveness of this mitigation is uncertain, but should reduce impacts to an acceptable level.

7.2.2 Populations

An estimated minimum of 81 deer and 25 elk would be displaced by mining, facilities, and mining activity by end of mine life. This displacement would not result in significant population losses, since mitigating measures have been committed.

Mule deer and elk would be killed by employees' vehicles on Highway 13 and County Road 47. An estimated average of 4 deer and an unknown number of elk would be killed on Highway 13 each year of mine life. Deer losses on County Road 47 and all elk losses cannot be estimated as at this time no kill frequency data exists. Mitigation would be required at mine plan review to minimize projected losses, if they occur.

Adverse impacts to golden eagles would be minimized by the buffer zones established as committed mitigation by the 1982 MFP coal update (see 7.1.5).

7.2.3 Threatened and Endangered

Buffer zones committed by decision in the 1982 MFP coal update would minimize impacts to bald eagles and their wintering areas (see 7.1.5).

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1 - Surface

| Resource Element | Committed Mitigation | Anticipated Impact Baseline | 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Habitats | | | | | | | | | Mitigation should |
| Sagebrush | Reclamation Regs and Special | 1967 Acres | 73 | 175 | 344 | 760 | Good | None | reduce impacts to an |
| Grassland | Stipulation (see 7.1.5) | 780 Acres | 28 | 68 | 136 | 301 | " | " | acceptable level see |
| Cropland | " | 100 Acres | 4 | 9 | 17 | 39 | " | " | 7.1.5 and 7.2.1 |
| Populations | | | | | | | | | |
| Mule deer | Lease stipulation (see 7.1.5) | 204 deer | 28 | 44 | 78 | 159 | Acceptable | None | These impacts are not |
| Elk | " | 62 elk | 8 | 11 | 15 | 25 | " | " | significant |
| Bald eagle | Buffer Zone (see 7.1.5) | Unknown | 0 | → | → | → | " | " | |
| Golden eagle | " | 6 nests | 0 | → | → | → | Good | " | |
| Red-tailed hawk | " | 2 nests | 0 | → | → | → | " | " | |

## 8. Recreation Resources

### 8.1 Affected Environment

A total of 960 acres of federal surface ownership is within the tract. This acreage has public access via Duffy Mountain access roads to the west. Heavy hunting pressure for elk and deer is experienced on and adjacent to the tract during the months of October and November with associated ORV use and camping. No actual visitor use data is available.

The Yampa River adjacent to the tract is on the National Park Service Nationwide Rivers Inventory list for wild and scenic rivers. No study has been authorized. Special designation of the river corridor (i.e., ACEC or Natural Area) will be considered in the Little Snake Resource Area RMP by 1985. The area has outstanding opportunities for floatboating, scenic viewing, birdwatching and camping, among others.

No public or private recreation facilities exist within or adjacent to the tract.

### 8.2 Environmental Consequences

Recreation is expected to increase in proportion to population growth with or without the proposed coal lease. The nature of recreation would remain dispersed in the majority of northwestern Colorado, with the exception of urban areas. If urban facilities do not keep abreast with population growth,

adverse conditions could arise such as lowering the quality of recreation opportunities as well as overcrowding existing facilities. It is anticipated that no significant impact would occur through the year 2000.

All public recreation opportunities would be lost on the tract. Since no current data is available in regard to numbers of hunters using Iles Mountain, it is difficult to guess the severity of displacing the hunters to a similar type environment or location, although some public outcry is expected from hunters who use the area. Otherwise, population growth of 60 in Craig and 20 in Meeker would have an insignificant effect on dispersed recreational activities.

Sights and sounds from surface mining operations and facilities would further degrade the quality of the environment in the adjacent Yampa River corridor. Cumulative impacts from the existing railroad and the new mine would diminish the quality of the recreation resource (for floatboating and other opportunities) along the river. While this may not be considered significant it is an important impact upon those who experience the recreation opportunities available here.

8.2.1 Short Term vs. Long Term

All recreation opportunities would be lost on tract in the short term (mine life). Short term impacts could also occur to floatboaters on the Yampa River as a result of sights and sounds from surface mining operations and facilities. There would be no significant long term impacts.

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Anticipated Impact Baseline | 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Recreation | | | | | | | | | |
| ACEC | FLPMA | Planning incomplete | | | | | No recreation data | | No ACEC identified as RMP just beginning |
| Wilderness | FLPMA and Wilderness Act | None | → | → | → | → | Good; no current recreation data | | |
| Wild and Scenic Rivers | NES/Wild and Scenic Rivers Act | None | | | | | " | | Wild and Scenic Rivers inventory completed on Yampa River adjacent to tract. No study has been conducted. |
| Land Use Planning Stips. | | None | | | | | No current recreation data | | |
| Proposed Mitigation | | None | | | | | " | | |
| Values on tract | | Hunting | Displace hunters | → | → | → | " | | All recreation opportunities within the permit area would be lost through mine life. Some public outcry is expected from hunters. |

## 9. Visual Resources

### 9.1 Affected Environment

VRM Class III and IV apply to the tract. The Yampa River corridor, north of the tract, is VRM Class II with A rated scenic quality. Visual sensitivity is medium to high and related to those who utilize the Yampa River for floatboating from May through July. No use figures are available (see Figure 9-1). The other public viewing corridor would be from Moffat County Road 30 which dead ends about one-quarter mile from the north side of the river. It is assumed that traffic volume is light.

Primary vegetation consists of sagebrush, grasses, and mountain shrub with rolling to steep topography and deep drainages sloping north toward the Yampa River. Aesthetics are that of open space and agriculture. Aesthetic value is enhanced by the Yampa River located directly north of the tract. Views are panoramic to the north, east and west from the high points on the tract.

### 9.2 Environmental Consequences

Severe disruption of the landscape would result from surface mining on the tract. The VRM Class III and IV objectives would not be met and the disturbed areas would be lowered to interim management Class V. The visual sensitivity level of the area is medium to high due to the existence of the free flowing river located in this arid climate.

In addition to the surface mine disturbance, landscape modification would occur on and off tract for haul roads, loadout facilities, a railroad spur, and mine facilities as well as power/telephone services and topsoil storage for a total of 1183 acres with adverse visual impacts. The new coal loadout and railroad spur would be especially disruptive along the river corridor (Class II area) because it would be highly visible from the river. Sights and sounds from the facility would adversely affect recreationists on the river and residences in the area.

9.2.1 Short Term vs. Long Term

Visual impacts would prevail throughout mine life and until successful reclamation is completed. On a long-term basis impacts should be minimal because OSM requires revegetation and returning the land mass to its original form.

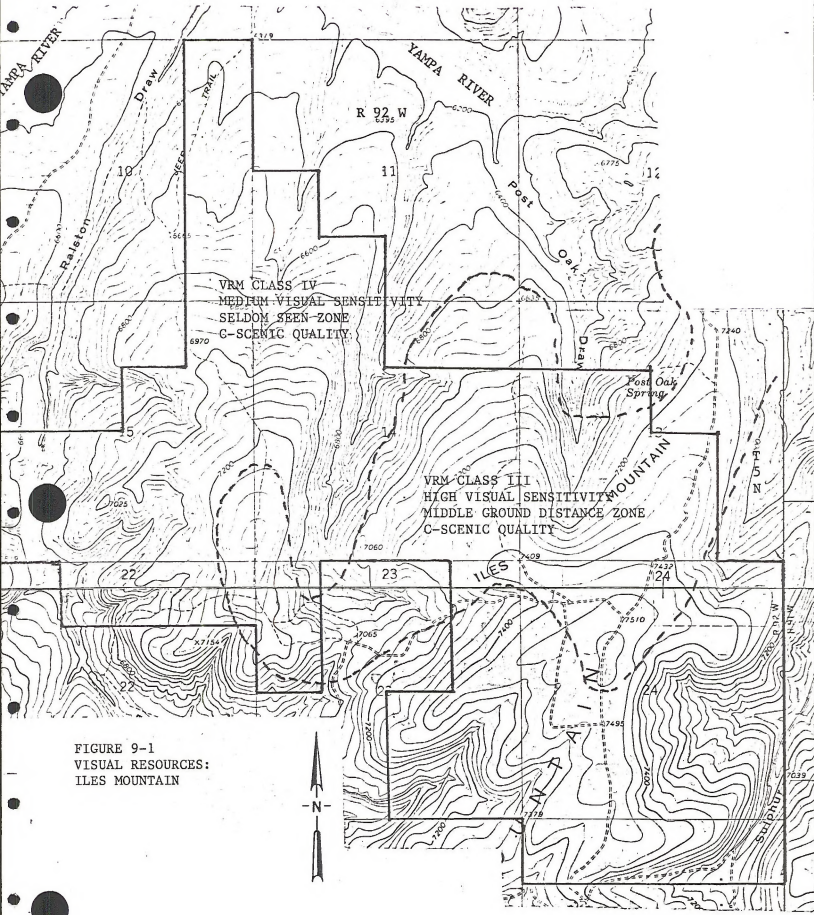



FIGURE 9-1
VISUAL RESOURCES:
ILES MOUNTAIN

SCALE: 1:24,000

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Anticipated Impact Baseline | 1992 | 1995 | 2000 | EOL | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Visual Resources | | | | | | | | | |
| Class | OSM Reclamation Regulations | III & IV | V 105 acres | V 252 acres | V 497 acres | III & IV 1100 acres total | Good | | Tract should revert to original classes (20 and 30 years) after successful reclamation is completed. Insignificant impact. |
| Land Use Planning Stips. | | None | | | | | | | |
| Proposed Mitigation | | None | | | | None | | | |

## 10. Cultural Resources

### 10.1 Affected Environment

A Class II survey for prehistoric and historic values was conducted in the area by the Laboratory of Public Archaeology (LOPA) during the summer of 1975 (Arthur 1975). Their survey covered approximately 1,700 acres on this tract. No prehistoric or historic sites were located and recorded by LOPA. A Class III survey of 20 drill locations and associated access roads was also conducted in this area by Western Cultural Resource Management (1979). Seventeen of these locations are located within the tract boundary and ten of these are on land included within the LOPA survey. Seven additional acres were covered by the 1979 survey. No sites and one isolated find were located and recorded. A Class III survey will be conducted on the remainder of the tract by a qualified archaeologist under contract with the coal lessee prior to approval of the mining and or exploration plans. The probability is 5 percent that sites eligible to the National Register of Historic Places (NRHP) would be found on the tract.

The National Register of Historic Places for Moffat County has been consulted and no sites on the National Register of Historic Places are currently within the tract (United States Department of Interior, HCRS 1979). The State Historic Preservation Officer has been consulted and no sites eligible to the National Register of Historic Places are currently within the tract (Colorado State Inventory 1979).

10.2 Environmental Consequences

Construction activities starting in 1992 would involve on-site facilities and haul roads (350 acres), railroad (3 acres), powerline (40 acres) and telephone lines (40 acres). No evaluation can be made until specific locations are determined and surveys completed.

In 1995, prehistoric and historic sites would be impacted directly and indirectly. This is when the greatest impact to cultural resources would begin. Based on data gathered during surveys conducted on the tract and in the vicinity the probability is 10 to 15 percent that prehistoric sites/isolated finds would be found on the unsurveyed portion of the ridges or as rock art sites on the rock outcropping on the slopes. The probability is 90 percent that historic sites would be found along drainage bottoms and where access is available. For areas of no or limited access or where level land is not available, the probability of finds is 10 percent. Besides direct impacts from mining, indirect impacts would occur from site vandalism and increased human activity in the area. Although the mine owner does control use of access roads, increased access to sites would be caused by new mine roads.

10.2.1 Mitigation: Committed

(1) The lessee shall conduct a Class III cultural resource intensive field inventory in areas that will have surface disturbance (i.e., portals, air shafts, acess roads and areas of subsidence when identified). The inventory shall be conducted by qualified professional cultural resource specialists

holding current Department of Interior Antiquities Permits and in accordance with current Bureau of Land Management, State, District or Resource Area guidelines and stipulations. A report of the inventory and recommendations for protecting any cultural resources identified shall be submitted to the Administrator of the Western Technical Center (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area) and the authorized officer of the BLM. The lessee shall undertake measures, in accordance with instructions from the Administrator of the Western Technical Center (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area) and the authorized officer of the BLM. The lessee shall undertake measures, in accordance with instructions from the Administrator of the Western Technical Center (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area), to protect cultural resources on the leased land.

The lessee shall not commence the surface disturbing activities until permission to proceed is given by the Administrator of the Western Technical Center (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area), to protect cultural resources on the leased land. The lessee shall not commence the surface disturbing activities until permission to proceed is given by the Administrator of the Western Technical Center (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area).

(2) The lessee shall protect all cultural resource properties within the lease

area from coal-related activities until the cultual resource mitigation measures can be implemented as part of an approved mining and reclamation plan or exploration plan.

(3) The cost of conducting the inventory, preparing reprots, and carrying out mitigation measures shall be borne by the lessee.

(4) If cultural resources are discovered during operations under this lease, the lessee shall immediately bring them to the attention of the Administrator of the Western Technical Center (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area), or the authorized officer of the surface managing agency if the Administrator of the Western Technical Center, or District Mining Supervisor, as appropriate, is not available. The lessee shall not disturb such resources except as may be subsequently authorized by the Administrator of the Western Technical Center (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area). Within two (2) working days of notification, the Administrator of the Western Technical Center (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area) will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the surface managing agency unless otherwise specified by the authorized officer of the BLM or of the surface managing agency (if different).

(5) All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law.

References Cited

Arthur, Christopher, 1977. Archaeological Reconnaissance of Proposed Coal Lease Areas in Moffat, Rio Blanco & Routt Counties, Colorado. Reports of the Laboratory of Public Archaeology, No. 1. Colorado State University, Fort Collins, Colorado.

Burney, Michael S., 1979. An Archaeological Survey for a Series of Exploratory Drill Holes & Associated Access Roads Proposed to be Placed by AMCA Coal Leasing, Inc. on Iles Mountain in Southeast Moffat County, Colorado. Western Cultural Resource Management, Inc., Boulder, Colorado.

Green River/Hams Fork Final Environmental Impact Statement, Coal. 1980.

Lischka, Joseph J., 1975. Cultural & Paleontological Reosurce Inventory and Evaluation of the Proposed W. R. Grace & Co. Railroad Corridors & Colowyo Mine Site, Moffat County, Colorado. University of Colorado, Boulder, Colorado.

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Ilex Mountain

State: Colorado

Leasing/Development Scenario: Surface

| Resource Element | Committed Mitigation | Anticipated Impact: Baseline | 1992 | 1995 | 2000 | EOL | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Cultural Resources | -Antiquities Act of 1906<br>-National Historic Preservation Act of 1966<br>-Archaeological Resources Protection Act of 1979 | 1 resource/889 ac. | 1 resource | → | → | → | Good-see LOPA: Coal Lease Tract survey - 1977 | -Increased activity may result in increased vandalism of sites. | -1700 acres have been surveyed @ Class III level - no cultural resources were found. Baseline data extrapolated from Arthur Class II, which is a nonrandom, nonstratified sample of the tract area. |

## 11. Economics

### 11.1 Affected Environment

The study area consists of the eastern portions of Rio Blanco and Moffat counties, and includes the communities of Meeker and Craig.

Eastern Rio Blanco County is expected to experience rapid growth during the 1990s as the result of oil shale development. Therefore, the labor market is likely to be tight, and any additional jobs would have to be filled by new people migrating to the county. However, eastern Moffat County is expected to receive little impact from oil shale development, and to have some surplus labor available for new jobs.

As a result, Meeker will be facing the need to expand its sewer, fire protection, and other facilities and services during the decade, while Craig's capital improvement requirements should be smaller.

### 11.2 Environmental Consequences

Leasing the Iles Mountain tract would cause moderate impacts to Moffat County revenues but no significant impacts to the communities in way of population in the area. At peak construction in 1992, the population of both communities would be increased less than one-half percent. Full mine operation, in 1995 and after, would temporarily raise Meeker's population about one percent. Because of its slack labor market, little or no impact would occur in Craig during the operation period.

Craig would receive employment gains of about 65 at peak construction and 120 during full mine operation, but most of these would be filled by local residents and population growth would be only about 60. Total employment in Meeker would increase by about 15 during peak construction and 20 at full mine operation. Because these jobs would be filled by immigrants, population would rise by about 30 and 40 respectively. Housing problems should be minor. Construction of the mine would create annual wage and salary income of about $2,700,000 in Craig and $500,000 in Meeker. At full operation, including secondary employment, the mine would raise income about $3,600,000 in Craig and $600,000 in Meeker.

Impacts to livestock grazing, cropland and hunting, the only present activities on the tract that affect the local economy, would not be significant. A loss of AUMs to one ranching operation would cause estimated reductions of three percent in ranch gross sales and two percent in net income. Effects on the local area's economy would be negligible.

The mine would pay a total of $5,400,000 annually in ad valorem and severance taxes and federal royalty. Of that amount, some $950,000 would accrue or be returned to Moffat County. Craig would receive an additional $70,000 annually in property and sales taxes induced by area growth, plus its severance tax share, but Meeker's revenue benefits would be small.

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: Surface Mine

| Resource Element | Committed Mitigation | Baseline | Anticipated Impact (percent of baseline) 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Population | | | | | | | | | |
| Craig | None | Varies by year | 0 | 0 | 0 | NA | Medium | Only construction materials | Reasonable baseline projections cannot be made beyond the year 2000 |
| Meeker | | | 0 | 1 | 0 | NA | | | |
| Employment | | | | | | | | | |
| Moffat County | " | " | 1 | 1 | 1 | " | " | " | |
| Rio Blanco Cty. | | | 0 | 0 | 0 | | | | |
| Wage & Salary Income | | | | | | | | | |
| Moffat County | " | " | 1 | 2 | 2 | " | " | None | |
| Rio Blanco Cty. | | | 0 | 0 | 0 | | | | |
| Moffat County Revenue | " | " | 0 | 9 | 8 | " | " | " | |
| Community revenue | | | | | | | | | |
| Craig | " | " | 0 | 1 | 1 | " | " | " | |
| Meeker | | | 0 | 0 | 0 | | | | |

## 12. Social

### 12.1 Affected Environment and Environmental Consequences

Population impacts of this tract upon Craig and Meeker, the two towns most likely to be affected, would be less than one percent above expected baseline growth for any year. This growth rate is small enough that no significant social impacts would be generated for either community.

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: #1

| Resource Element | Committed Mitigation | Anticipated Impact | | | | | | | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Social | None | Craig: | 1990 | 1991 | 1992 | 1993 | 1994 | 1995+ | Poor | — | — |
| | | Baseline | 18,611 | 19,338 | 18,045 | 18,124 | 18,289 | 18,453 | | | |
| | | Transient Construction | 8 | 53 | 59 | 14 | — | — | | | |
| | | Permanent | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| | | Total Population Impact | 8 | 53 | 59 | 14 | — | — | | | |
| | | Meeker: | | | | | | | | | |
| | | Baseline | 6,023 | 6,063 | 5,682 | 5,507 | 5,801 | 6,315 | | | |
| | | Transient Construction | 3 | 8 | 8 | 2 | 0 | 0 | | | |
| | | Permanent | 0 | 15 | 20 | 35 | 42 | 42 | | | |
| | | Total Population Impact | 3 | 23 | 28 | 37 | 42 | 42 | | | |

13. Land Use

13.1 Affected Environment

13.1.1 Agriculture

The tract contains land of one grazing allotment. The operator of the allotment (#4603) is the Axial Basin Ranch Company. The livestock class is cattle, and the season of use is from May 1 through October 30. The number of acres of public land within the boundaries of the tract is 960 and provides 87 AUMs for the allotment or 6% of the total AUMs available from public land within the allotment. Post Oak Spring, located inside the tract, is the only watering facility on the east side of the allotment, and is essential to livestock and wildlife. The tract contains 100 acres of farmground.

13.1.2 Rights-of-Way

The tract contains rights-of-way for utilities; however, none are major rights-of-way.

13.1.3 Withdrawals

There are currently four withdrawals in the Iles Mountain Tract. The legal description of the withdrawals are:

T. 5 N., R. 92 W., 6th P.M.

Section 10: Within

Section 11: Within

The BLM and FERC are currently working on relinquishment, if appropriate, or coal lease stipulations on the following withdrawals:

Reservoir Site # 10 1/2: E.O. July 15, 1915

Powersite Reserve # 121: E.O. July 2, 1910

Two withdrawals for the proposed Juniper Springs Reservoir project are PLO 3735 and 3736. They are also located in Sections 10 and 11. The Bureau of Reclamation, Upper Colorado region, has requested revocation of both withdrawals because they are no longer needed. Therefore, their input in coal leasing stipulations will not be solicited by the BLM.

13.2 Environmental Consequences

The disturbance of 40 acres of the 100 acres of farmland over the mine life is not considered significant.

The location of tract disturbance is such that cattle would essentially be displaced from the entire tract during the life of the mine. There would be 290 AUMs lost from private surface and 87 AUMs lost from public surface to total 377 AUMs lost. This is 17% of the total allotment, and is therefore significant in terms of impact to the livestock operation on this allotment.

Since Post Oak Spring is located inside the tract it would be inaccessible for livestock use. Livestock would be displaced for a 1 1/2 mile radius around this spring outside the tract resulting in approximately 300 AUMs lost (13% of the total allotment).

13.2.1 The rights-of-way are valid existing rights and are protected by incorporating the following stipulation. This lease is subject to all valid rights existing on the date issued. Since no major rights-of-way exist on tract it is assumed the lessee and right-of-way holder could work out moving the utility and no coal resources would be precluded.

13.2.2 Withdrawals

If FERC does not relinquish the two withdrawals for reservoir site #10 1/2 and powersite withdrawal #121 we assume the following powersite stipulation would be incorporated in the lease: Powersite stipulation (Form 3730-1, December, 1975 - Attached). Since the tract is 75 feet above the high water line of the reservoir we assume no impacts.

13.2.3 Long Term vs. Short Term

Over the short term, 377 AUMs would be lost until such time that reclamation occurred and the rangelands could be utilized by livestock again. This is a period of approximately 30 years. As a permit adjustment/reduction would be made on the Federal AUMs, it is not expected any livestock or rangelands would be stressed due to increased livestock concentrations on federal lands.

Form 3730–1
(December 1975)
(formerly 3500–1)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

# POWERSITE STIPULATION

The lessee or permittee hereby agrees:

(a) If any of the land covered by this lease or permit was, on the date the lease or permit application or offer was filed, within a powersite classification, reservation, or project on which an application for a license or preliminary permit is pending before the Federal Power Commission or on which an effective license or preliminary permit had been issued by the Federal Power Commission under the Federal Power Act, or on which an authorized power project (other than one owned or operated by the Federal Government) had been constructed, the United States, its permittees or licensees shall have the prior right to use such land for purposes of power development so applied for, licensed, permitted, or authorized and no compensation shall accrue to the mineral lessee or permittee for loss of prospective profits or for damages to improvements or workings, or for any additional expense caused the mineral lessee as a result of the taking of said land for power development purposes. It is agreed, however, that where the mineral lessee or permittee can make adjustments of his improvements to avoid undue interference with power development, he will be permitted to do so at his own expense. Furthermore, occupancy and use of the land by the mineral lessee or permittee shall be subject to such reasonable conditions with respect to the use of the land as may be prescribed by the Federal Power Commission for the protection of any improvements and workings constructed thereon for power development.

(b) If any of the land covered by this lease or permit is on the date of the lease or permit within a powersite classification or reservation which is not governed by the preceding paragraph, the lease or permit is subject to the express condition that operations under it shall be so conducted as not to interfere with the administration and use of the land for powersite purposes to a greater extent than may be determined by the Secretary of the Interior to be necessary for the most beneficial use of the land. In any case, it is agreed that where the mineral lessee or permittee can make adjustments to avoid undue interference with power development, he will be permitted to do so at his own expense.

GPO 832–535

13.2.4 Unavoidable Adverse

There would be unavoidable temporary loss of 377 AUMs on the tract during the mining operation.

13.3.5 Proposed Mitigating Measures

It would be necessary to pipe the water from Post Oak Spring to the portion of the allotment outside the tract for livestock use or provide another source of water in this area through the life of the mine. This proposed mitigating measure would make the impact of the loss of Post Oak Spring insignificant if it is incorporated into the lease. If incorporated into the lease as a stipulation, the stipulation would require the lessee to provide water for livestock to that portion of the allotment outside the tract previously watered by Post Oak Spring through the life of the mine.

THE SITE SPECIFIC ANALYSIS

Attachment 2A

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: _____

| Resource Element | Committed Mitigation | Anticipated Impact | | | | | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| | | Baseline | 1992 | 1995 | 2000 | EML | | | |
| Land Use: Agricultural | — | Up to 377 | Up to 377 | Up to 377 | Up to 377 | 377 AUM | Good | None | |
| Post Oak Spring | | 300 1/ | 300 | 300 | 300 | 300 AUM | | None | See narrative |
| Rights-of-way | | No major ROW | See narrative | → | → | → | | | |
| Dryland farming and seeded pasture | | 99.66 Ac. | 4 | 9 | 17 | 39 | | | Short term loss, returning to premining use should not be a problem. Insignificant impact |

1/ Grazing off tract watered from Post Oak Spring.

## 14. Transportation

### 14.1 Affected Environment

The major transportation routes in the area are Colorado State Highway 13/789 and the Denver and Rio Grand Western (DRGW) railroad. State Highway 13 is a paved two-lane north-south highway running between Interstate 70 at Rifle and Interstate 80 in Wyoming and serves several small towns in between. The average daily traffic on Highway 13 between Craig and Hamilton is estimated at 2750 for 1982.

Access to the tract is provided by Moffat County Road 47 (sulphur gulch road) and private roads within the tract. Public access is available to 4-wheel drive vehicles from Bureau of Land Management roads on Duffy Mountain to the west.

Table 14-1 gives the projected average daily traffic (ADT) for State Highway 13 between Craig and Hamilton (segment D). The table also gives the design hour volume (DHV) which is defined as the 30th highest hourly volume occurring in a year. DHV is multiplied by ADT to project peak hour traffic (PHT) given in Table 14-2. Any projections past the year 2000 are inaccurate.

TABLE 14-1

PROJECTED AVERAGE DAILY TRAFFIC FOR COLORADO HIGHWAY 13

| Road Segment | Segment Length | Average Daily Traffic 1985 | 1992 | 1995 | 2000 | EML | DHV |
|---|---|---|---|---|---|---|---|
| D | 12.7 | 2950 | 3400 | 3600 | 3900 | 4700 | .12 |

Table 14-2 gives the volume to capacity ratios (%) for the peak hour traffic through EML. This ratio, between PHT and the highway capacity, indicates traffic conditions on the highway during high use periods. Any coefficient greater than 1.0 will indicate that significant congestion will occur resulting in time delays and increased safety risks. A coefficient of 0.8-1.0 will indicate a high probability for at least momentary or minor road congestion. A coefficient of 0.8 or below will indicate that the road segment has adequate capacity to handle the projected traffic. The level of service for State Highway 13 is expected to remain constant through end of mine life (EML).

TABLE 14-2

PROJECTED VOLUME/CAPACITY RATIO - COLORADO HIGHWAY 13

| Road | Peak Hour Traffic | | | | | Capacity (Volume @ Service | Volume/Capacity Ratio | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Seg. | 1985 | 1992 | 1995 | 2000 | EML | Level "C") | 1985 | 1992 | 1995 | 2000 | EML |
| D | 354 | 408 | 432 | 468 | 564 | 790 | .45 | .52 | .55 | .59 | .71 |

Table 14-3 indicates the total number of accidents projected for the road segments. By determining the vehicle miles travelled per year, times the accident rate divided by one million, the total number of accidents per year

can be projected. The same methodology is used to project the number of fatal accidents per year, except the product is divided by 100 million instead of one million. The methodology assumes that no significant increase in the accident rates will occur.

TABLE 14-3

PROJECTED ACCIDENT RATE FOR COLORADO HIGHWAY 13 AND U.S. 40

| Road Seg. | Seg. Lgth. | Average Daily Traffic 1985 | 1992 | 1995 | 2000 | EML | Total Accident Rate (1980) | Total Accidents 1985 | 1992 | 1995 | 2000 | EML |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | 12.7 | 1950 | 3400 | 3600 | 3900 | 4700 | 2.95 | 40 | 46 | 49 | 53 | 64 |

14.1.1 DRGW Railroad

The Denver and Rio Grande Western Railroad has a main line running from Denver through the Moffat Tunnel terminating in Craig with a 25 mile spur line to Axial south of Craig. Currently the rail line between Craig and Bond has approximately eight (8) unit trains per day passing over the tracks while the segment from Bond to Denver has twenty (20) unit trains per day. The present control system is an automatic block system. Six at-grade crossings exist along this route. Traffic delays at each crossing are currently less than 15 minutes a day. Table 14-4 lists the Colorado crossing I.D. number, approximate location, and existing hazard rating through 1996:

TABLE 14-4

EXISTING RAILROAD GRADE CROSSING HAZARD RATINGS

| Colorado Crossing I.D. Number | Location | Hazard Rating (Accidents per 5 years) | Hazard Rating 1996 |
|---|---|---|---|
| 0040-28-05 | West of Hayden | .63 | .92 |
| 0040-28-10 | East of Hayden | .15 | .84 |
| 0040-28-15 | East of Hayden | 1.25 | .91 |
| 0134-28-05 | East of Toponas | .15 | .66 |
| 0394-42-05 | Craig | .63 | 4.85 |
| 0394-42-10 | Craig | 1.32 | 1.56 |

Source: Colorado Department of Highways.

14.2 Environmental Consequences

Table 14-5 gives the increases in ADT and PHT as a result of the new mine. Table 14-6 gives the increased volume to capacity ratios using the same methodology as explained in Section 14.1. The increase in traffic would have an insignificant effect on the highway which has enough excess capacity to absorb the project's work vehicles without lowering the service level.

Table 14-7 indicates that the number of increased traffic accidents resulting from the proposed mine is low.

It is assumed that Moffat County Road 47 would be the main access route to the mine. Traffic would increase dramatically on this road with associated impacts of increased noise and annoyance to residents as well as increased wildlife disturbance.

An insignificant increase in ADT on State Highway 13 between Hamilton and Meeker would also occur. This would be caused by the small increase in population (40) in Meeker.

Other impacts associated with the project's transportation needs would be wildlife disturbance (see Wildlife), increased exhaust emissions and increased noise (see Noise) as well as increased maintenance costs.

TABLE 14-5

INCREASED AVERAGE DAILY TRAFFIC - COLORADO HIGHWAY 13

| Road | Average Daily Traffic | | | | | Increase in Peak Hour Traffic | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Segment | 1985 | 1992 | 1995 | 2000 | EML | 1985 | 1992 | 1995 | 2000 | EML |
| D | 2950 | 3500 | 3800 | 4100 | 4700 | 0 | 62 | 124 | 124 | 0 |

TABLE 14-6

INCREASED VOLUME/CAPACITY RATIO - COLORADO HIGHWAY 13

| Road | Peak Hour | | | | | Capacity (Volume @ Service | Volume/Capacity Ratio | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Segment | 1985 | 1992 | 1995 | 2000 | EML | Level "C") | 1985 | 1992 | 1995 | 2000 | EML |
| D | 0 | 470 | 556 | 592 | 0 | 790 | 0 | .59 | .70 | .75 | 0 |

TABLE 14-7

INCREASED ACCIDENT RATE FOR COLORADO HIGHWAY 13

| Road | Segment | Increased Average Daily Traffic | | | | Total Accident Rate | Increase in Accidents | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Segment | Length | 1985 | 1992 | 1995 | 2000 | (1980) | 1985 | 1992 | 1995 | 2000 |
| D | 12.7 | 0 | 100 | 200 | 200 | 2.95 | 0 | 1 | 3 | 3 |

14.2.1 DRGW Railroad

The project would add over one train movement per day. One unit train would carry approximately 7500 tons of coal. Over one-half train per day would carry approximately 4600 tons of coal produced per day while the other half would return to the mine. The limiting factor for the rail line's capacity is anticipated to be rolling stock and power equipment, not the rail's carrying capacity. The addition of one train per day would increase the grade crossing's hazard rating.

14.2.2 Short Term vs. Long Term

Impacts to the transportation system would be short term.

14.2.3 Unavoidable Adverse Impacts

Adverse environmental impacts on the transportation system which cannot be avoided are: increased traffic accidents, increased grade crossing hazard ratings, increased capital expenditures for road maintenance and surface disturbance for new roads and improvements.

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Anticipated Impact: Baseline | 1992 | 1995 | 2000 | EOL | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Transportation | | | | | | | | | |
| Coal-Highway 13 | | 0 → | Increased → | AUT → | → | → | Good | None | Increased traffic on County Road 47 would be dramatic and provide annoyance to residents. All impacts are insignificant and would last throughout mine life. |
| Employee-Highway 13 | | 0 | 100 | 200 | 200 | 0 | " | | |
| Colorado Highway 13 | | | Increased .59 | Volume/ .70 | Capacity .75 | Ratio 0 | Good | | |
| DRGW Railroad | | | Increased 0 | Train one train/day | Movements → | 0 | Good | | |

## 15. Noise

### 15.1 Affected Environment

Existing noise on the tract is that of "open air" agriculture or natural sounds. Background noise from coal mining operations to the north may reach portions of the tract but would be low level. Coal trains run periodically to the north of the tract adding to the background noise. Noise levels are estimated at 25 to 30 dB for the majority of the tract. A noise level of 50 dB is considered the threshold for uncomfortable noise for humans.

### 15.2 Environmental Consequences

The introduction of a new surface mine in the area would dramatically raise noise levels in and around the tract. Noise from a typical surface mine operation is estimated to be 78 dB at 500 feet from the source. Noise would be generated by mining activities such as trucks hauling coal, the loadout facilities, heavy equipment, trains, and increased highway traffic.

The increase in noise levels along State Highway 13 is less than 1 dB which is insignificant. However, traffic noise would increase dramatically (to approximately 50 dB @ 100 feet) along County Road 47. This would have adverse effects upon those few people residing along this road. This increase would be a definite annoyance to those residents.

The coal loadout facilities and increase in train traffic along the Yampa River would increase noise levels in and along the river corridor. This would destroy the tranquility of this portion of the river which experiences floatboating and fishing activities. One residence across the river would also experience an increase in noise if not annoyance from noise produced by the loadout facility. Wildlife in and around the tract would also be affected to some degree.

15.2.1 Short Term vs. Long Term

The noise impacts would last throughout the life of the mine, from construction through full production.

15.2.2 Unavoidable Adverse Impacts

Increases in noise would be unavoidable and adverse.

Tract Name or Number: Iles Mountain

State: Colorado

Leasing/Development Scenario: 1

| Resource Element | Committed Mitigation | Anticipated Impact: Baseline | 1992 | 1995 | 2000 | EML | Data Reliability | Irreversible and Irretrievable Commitments | Comments (Context) (Proposed Mitigation) |
|---|---|---|---|---|---|---|---|---|---|
| Noise | | | | | | | | | |
| Sources | | Natural and background noise from existing mine north of tract | Construc-tion | Mine operation | Mine operation | Natural sounds | Fair | | |
| Levels on tract @ 500' | | 25-30 dB | 75 dB | 78 dB | 78 dB | 30 dB | " | | Increased on tract noise levels would annoy local residents within 1-2 miles of developments. |
| Transportation (Hwy. 13) | | Increase in $L_{eq}$ @ 100 feet: 0 dB | <1 dB → | → | → | 0 dB | | | Increase is insignificant |
| Impact to general population | | None | Increased noise levels will irritate local residents → | → | → | None | | | Increased noise along Yampa River from coal loadout would destroy tranquility of the area for floatboaters and local residence |
| Health and Safety Standards | MSHA regulation | None | → | → | → | → | | | |

16. Net Energy

Net Energy Worksheet

| Energy Inputs | Amount per year (in BTUs) | Mine Life (20 years) |
|---|---|---|
| 1. Mining Operation | a. $2.7 \times 10^{11}$ | b. $5.4 \times 10^{12}$ |
| 2. Product Transportation | a. $11.86 \times 10^{11}$ | b. $2.37 \times 10^{13}$ |
| 3. Employee Transportation | a. $10.29 \times 10^{9}$ | b. $2.06 \times 10^{11}$ |
| 4. Infrastructure Support | a. $1.91 \times 10^{9}$ | b. $3.82 \times 10^{10}$ |
| 5. Total | a. $1.46 \times 10^{12}$ | b. $2.94 \times 10^{13}$ |
| Energy Outputs | a. $3.61 \times 10^{13}$ | b. $7.22 \times 10^{14}$ |
| Ratio (output:input) | a. 24.73:1 | b. 24.73:1 |

Calculations

1. Annual production x BTUs expended/ton
   $1{,}673{,}450 \times 1.614 \times .10^{5} = 2.7 \times 10^{11}$

2. Annual production x one-way haul (loaded) x BTUs for transport mode + Annual production x one-way haul (empty)
   $1{,}673{,}450 \times 3 \times 1{,}900 = 9.54 \times 10^{9}$ )Truck
   $1{,}673{,}450 \times 3 = 5.02 \times 10^{6}$ )
   $1{,}673{,}450 \times 1000 \times 392 = 6.56 \times 10^{11}$ )Train
   $1{,}673{,}450 \times 1000 \times 311 = 5.20 \times 10^{11}$ )

   Total $= 11.86 \times 10^{11}$

3. # employees x # miles to work x 2 x 6,250 BTUs x # working days/year
   $120 \times 13 \times 2 \times 6{,}250 \times 260 = 5.07 \times 10^{9}$ (Craig)
   $20 \times 38 \times 2 \times 6{,}250 \times 260 = 2.47 \times 10^{9}$ (Meeker)

   Total $= 7.54 \times 10^{9}$

4. # people as result of project x 17,465 x 365
   $300 \times 17{,}465 \times 365 = 1.91 \times 10^{9}$

Energy outputs = annual production x coal quality (BTUs/ton)
$1{,}673{,}450 \times 21{,}600{,}000 = 3.61 \times 10^{13}$

Ratio = output ÷ input
$3.61 \times 10^{13} \div 1.46 \times 10^{12} = 24.73{:}1$